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ADMINISTRATIVE OFFICE: American Meteorological Society, Office of Executive Secretary, 3 Joy Street, Boston 8, Mass.

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This publication has been made possible through support and sponsorship extended by the Geophysics Research Directorate of the Air Force Cambridge Research Center, Air Research and Development Command, under Contract No. A. F. 19 (604)-2062.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 9

AUGUST 1958

No. 8



SPECIAL FEATURE IN THIS ISSUE

Recent Literature on Radar Meteorology

By
Geza Thuronyi

(For complete table of contents see back cover)

Published monthly at Prince and Lemon Streets, Lancaster, Pa., by the AMERICAN
METEOROLOGICAL SOCIETY, 3 Joy Street, Boston 8, Mass.

Printed and issued by: Lancaster Press, Inc.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

Published by the
NATIONAL RESEARCH COUNCIL ON METEOROLOGICAL SERVICE

No. 2

AUGUST 1971



SPECIAL FEATURE IN THIS ISSUE

THE STATE OF THE ART OF METEOROLOGICAL RESEARCH

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises an annotated bibliography of important references on a special subject (usually arranged chronologically). No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

- | | | | |
|---------------------|-------------------------|--------------------|------------------|
| 1. Atmos. Pollution | 2. Aerobiology | 3. Cloud Physics | 4. Hail |
| 5. Tornadoes | 6. Volcanic Dust | 7. Climat. Changes | 8. Thunderstorms |
| 9. Icing | 10. Acoust. Propagation | 11. Evaporation | |

Vol. II, 1951

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|------------------------|--------------------------|-------------------|------------------------|
| 1. Extended Forecast. | 2. Long Range Forecast. | 3. Soil Temp. | 4. Constants, etc. |
| 5. Clim. of Near East | 6. Clim. of Middle East | 7. Special Winds | 8. Radar Storm Detect. |
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| 1. Clim. of N.W. Africa | 2. Carbon Dioxide | 3. Clim. of Argentina, etc. | 4. Dew |
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Vol. IV, 1953

- | | | | |
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| 1. Turbulence Theory | 2. Turbulent Diffusion | 3. Frost | 4. Clim. of Australia, etc. |
| 5. High Level Winds | 6. Winds in Stratosphere | 7. Jet Stream | 8. Radiation Bioclim. |
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Vol. V, 1954

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| 1. Oceanog. Met. | 2. Clim. of S.E. Asia | 3. Auroral Physics | 4. Tropopause |
| 5. Balloons | 6. Numerical Forecast. | 7. Radiation Data | 8. Vertical Motion |
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Vol. VI, 1955

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| 1. Bibliog. of Bibliog. | 2. Texts & Monogr. Bibliogs. | 3. Storm Surges |
| 4. Ionospheric Prop. | 5. Photochem.—Upper Atmos. | 6. Cloud Physics |
| 7. Radar Cloud Physics | 8-9. Atmos. Nuclei | 10. Weather Modification |
| | | 11. Cooling Power |

Vol. VII, 1956

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| 1. Synoptic Met.-Arctic | 2. Clim. of Enclosed Spaces | 3. Cosmic Rays (-1952) |
| 4. Cosmic Rays (1953-56) | 5. Atmos. Radioactivity | 6. Inversions |
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| 1. Solar Weather Relations | 2. Night Airglow | 3. Forecasting Special Elements |
| 4. Forest Micrometeorology | 5. Hydromet. Forecasting | 6. Numerical Forecasting (Suppl.) |
| 7. Albedo | 8. Meteors | 9-10. Tropospheric Propagation |
| | | 11. Medical Meteorology |

Vol. IX, 1958

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| 1. Radioastronomy | 2. Solar Astrophysics | 3. Radioactivity in Atmosphere |
| 4. Waves and Currents | 5. Physical Oceanog. | 6. Dynamic & Phys. Oceanog. |
| 7. Long Range Forecasting | 8. Radar Met. | |

Other bibliographies in preparation are:

<i>Actinometers</i>	<i>High Atmosphere Temperatures</i>	<i>Ozone</i>
<i>Cosmic Rays</i>	<i>Mesometeorology</i>	<i>Singularities</i>
<i>Geomagnetism</i>	<i>Micrometeorology</i>	<i>Synoptic Aerology</i>

Part III contains a listing of reviews, translations, reprints, and the contents of important publications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue comprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DNLM:	U. S. National Library of Medicine, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146-151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, Jahrgang 2 (Vol. 2), Heft 5/6 (No. 5/6), pages 146-151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

9.8-1

551.509.617(08)

†U. S. Advisory Committee on Weather Control, **Final report**. Letter of transmittal, Dec. 31, 1957. 2 vol. (32+422 p.). Vol. 1, **Findings and recommendations**. Vol. 2, **Technical reports**, figs., photos, tables, refs., bibliogs. Vol. 2, Appendix D, **Bibliography on weather modification and cloud physics**, comp. by Geza Thuronyi, Marina Sze and Wilhelm Nupen; ed. by Malcolm Rigby (see 9.8-47). DWB—The first Vol. of this final report on the history, personnel activities, and reports contains the Committee's findings and recommendations emanating from 3 years of intensive and extensive investigations and studies. Vol. II is composed of 6 technical reports on statistical evaluation, a number on physical evaluation, one on the legal and one on the economic aspects, and a number on special local evaluation projects, etc. A bibliography of 2259 references to the world's literature is arranged in the general form of the report itself. The bibliography contains a detailed subject and geographic index and an author index. The major statistical conclusions were: 1) that up to 10-15% more precip. can be squeezed out of seeded clouds on the Pacific Coastal Ranges of the U. S. during winter storms; 2) in non-mountainous parts no significant proof of either increase or of no increase could be found; 3) no negative effects (overseeding) could be detected; 4) no conclusions could be reached regarding heat suppression. The physical evaluation conclusions are briefly: 1) AgI seeding from ground generators is a valid technique but won't necessarily produce results; deactivation by sunshine and heat is negligible; enough AgI can be found 30 mi away (in some cases) to produce seeding effects; and 2) physical measurements in clouds indicate that sometimes there is a deficiency of natural ice forming particles. For review on the Bibliography, see 9.8-47. For listing of contents of Vol. 2, see p. 512, April 1958, *MAB*. Articles abstracted separately. *Subject Headings*: 1. **Weather Control Committee Report** 2. **Cloud seeding evaluation**. I. Orville, Howard T., (*Chrm.*)—*M.R.*

9.8-2

551.5:061.2(05)

Meteorological Society of Japan, Tokyo, 75th Anniversary Volume of the Journal. Ed. by Sigekata Syono et al. Pub. Nov. 1957. 402 p. figs., tables, refs., eqs. "The present volume commemorates the 75th anniversary of the appearance of the First not the Second Series of its Journal." DWB, DLC—This remarkable volume contains 58 papers (all in English except 4 which are in French and 1 in German), of which 26 are from the U. S., Europe or India. The papers are heavily weighted towards general circulation, jet stream, and forecasting; but a few are on cloud physics, micro- or meso-meteorology. The foreword gives the important facts about the founding of the Meteorological Society of Tokyo in May 1882 with a membership of 38, and of the journal *Kisho Shushi*, which appeared irregularly up to July 1888 when the journal became a regular monthly publication, and the society changed its name to the Meteorological Society of Japan. In 1904, the journal took on the added English title it has at present, and began publishing articles in English, French and German. *Subject Headings*: 1. **Meteorological Society of Japan, Journal** 2. **Anniversary publications**. I. Syono, Sigekata (ed.)—*M.R.*

9.8-3

551.57:551.501.777

*Pushkarev, V. F. (ed.), **Voprosy metodiki nabliudeniĭ nad ispareniem, vlazhnost'iu pochvy snezhnym pokrovom**. [Problems of the methodology of observations of evaporation, soil moisture, and snow cover.] Leningrad. Gosudarstvennyiĭ Gidrologicheskiiĭ Institut, Trudy, 45(99), 1954. 283 p. figs., tables, refs., eqs. DLC (GB651.L38)—A substantial collection of articles on many aspects of evaporation, soil moisture and snow cover measurement. Each

article contains detailed observational data and graphical analysis, plus references to other work along the same lines. (For listing of contents, see Pt. III, p. 1144, Aug. 1957, *MAB* items to be abstracted separately.) *Subject Heading: 1. Hydrometeor observation.—M.R.*

TEXTBOOKS

See also: The atmosphere (Zavarina), 9.8-12.

9.8-4

551.5(02)(213)

Dominican Republic. Servicio Meteorológico (de la Marina de Guerra), *Notas suplementarias del curso de meteorología sinóptica* (tomadas de los cursos de entretamiento del Department of Weather, U. S. Air Force Technical School, Chanute Air Force Base, Illinois y adaptadas al español por Fernando Huerta). [Supplementary notes of the course in synoptic meteorology, taken from the training course of the Dept. of Weather, U. S. Air Force Technical School, Chanute Air Force Base, Illinois, and trans. into Spanish by Fernando Huerta.] Nov. 8, 1954. 33 lectures (unpaged). figs., forms, eqs. Mimeog. DWB (M M671no. 1954). Also; *Notas suplementarias del curso de meteorología sinóptica: temas diversos* [Supplementary notes of the course in synoptic meteorology: various themes.] Nov. 1955 each section repaged. figs. DWB (M M671no, 1955)—This supplement gives (in voluminous form also) a thorough course in synoptic, dynamic and physical meteorology for practical use (in Spanish). Most of the material is from standard sources (e.g., PETERSEN). Numerical prediction, climatology, tropical meteorology and comfort in tropics are emphasized in the second volume as are also notes on climatology and agriculture and rules for forecasting in the Caribbean—especially the Dominican Republic. A glossary of terms used in forecasting climatic data for Haiti-Santo Domingo, colored isohyetal charts, techniques for compilation of meteorological or climatological data and a number of other useful features are appended. *Subject Headings: 1. Meteorology textbooks 2. Tropical meteorology. I. Miller, Edward R. II. Huerta, Fernando (ed.).—M.R.*

9.8-5

551.509:551.51:551.515(02)

Georgii, W., *Flugmeteorologie*. [Aviation meteorology.] Frankfurt a.M., Akademische Verlagsgesellschaft, 1956. 332 p. 217 figs., 107 refs. Price: DM 35. Review by F. Steinhäuser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A.*, 10(1):112-114, 1957.—The first edition of this book was published in 1927. This second edition, which has been completely revised and brought up to date, contains a thorough discussion of meteorological phenomena for aviators and gliders. The author is on the executive staff of the Deutsche Forschungsanstalt für Segelflug (German Research Institute for Gliding). The main purpose of the book is to furnish navigators with essential meteorological information, but it is also written for meteorologists who will be interested in learning about the many applications of meteorology to aeronautics. The work is divided into 13 chapters dealing with: 1. Meteorology and aeronautics, 2. Structure of the atmosphere, 3. Thermodynamics of the dry atmosphere in the stage of condensation, 5. Condensation and precipitation, 6. The thunderstorm, 7. Clouds, 8. Artificial influences (clouds and precipitation), 9. Air masses, 10. Fronts, 11. Icing, 12. The subtropical and tropical atmospheres, 13. The jet stream and gliding (waves). *Subject Headings: 1. Meteorology textbooks for pilots 2. Aeronautical meteorology textbooks 3. General circulation 4. Gliding.—A.V.*

MANUALS, ATLASES, AND HANDBOOKS

See also: Radiation constants (Möller, Volz), 9.8-179.

9.8-6

551.508.952(02)

Dobson, G. M. B., *Observer's handbook for the ozone spectrophotometer*. Beckman, London, Publication, No. 145, 1957? 76 p. tables. numerous figs. DWB (M08.952 D635o)—The purpose of the Dobson spectrophotometer is to measure total amount of atmospheric ozone on the basis of sunlight intensity reduction. The instrument is described and shown in a photograph and several diagrams. Detailed instructions are given for making

measurements under various conditions, for calculating the ozone amount, for testing and for maintenance of the instrument. *Subject Headings:* 1. Ozone spectrophotometers 2. Instrument manuals.—G.T.

9.8-7

551.578:551.579.1:551.437

Johnson, Edward A. and Dils, Robert E., *Outline for compiling precipitation, runoff, and ground water data from small watersheds*. U. S. Forest Service. Southeastern Forest Experiment Station, Asheville, N. C., Station Paper, No. 68, Aug. 1956. 40 p. 8 figs., table, forms. DWB (634.9 U583s)—Data for 1935-54 for the Coweeta Hydrologic Laboratory in the Southern Appalachian Mountains are used as example for analyzing the rainfall over a small drainage basin. The various forms in use by the U. S. Forest Service for such analyses are described and their use illustrated. Mass rainfall curves are compiled, runoff records treated, watershed discharge data compiled, maximum stream flow, water yield, ground water depletion and water table elevation calculated and illustrated in graphs and tables. A number of rain gage stations were included in the sample survey. *Subject Headings:* 1. Watershed precipitation-runoff compilations 2. Coweeta Basin, N. Carolina.—M.R.

9.8-8

551.587(02) 551.5(02)

U. S. Bureau of Naval Personnel, *Aerographer's mate 3 & 2*. Its *Navy Training Courses*, NAVPERS 10363, 1955. 419 p. figs. DLC—A thorough manual or textbook for use by Navy observing and other nonforecasting aerological personnel in their training courses. The usual subjects of atmospheric structure, composition, circulation; air masses and fronts; thunderstorms, tornadoes and hurricanes; instruments and observations at surface, and aloft; map and chart analysis; records and reports; Navy and Weather Bureau Publications, instrument maintenance and repair, etc., are presented with charts, photographs and drawings made from the latest equipment or techniques and theories especially emphasizing Naval or Marine aspects of meteorology. Extensive lists of questions are to be found at the end of each chapter. The book is well indexed and has ample supplementary aids such as conversion tables, sample forms, nomograms, etc. *Subject Headings:* 1. Aerology manuals 2. Meteorology textbooks.—M.R.

9.8-9

551.509:317:551.587

*U. S. Air Weather Service, *Mean contours, isotachs, and isotherms over the Northern Hemisphere at the 300-, 200-, and 100-mb levels*. Jan., Feb., July and Aug. 1949. No. 7 in a series of background reports for AWS Manual 105-50. Its *AWS Technical Report*, 105-128, Nov. 1954. 40×53 cm. 45 p. numerous charts, 6 tables. DWB—Large (atlas size) charts of entire Northern Hemisphere for Jan., Feb., July and August 1949 for each level (300, 200 and 100 mb) and for each element (pressure, contours with polar tropopause intersections; geostrophic flow charts with isotachs and axes of strongest flow (mean jets), and mean isotherms to 2°C intervals with occasional 1°C interpolation). Introduction and text give details of construction and applications, especially to forecasting. The fact that the winter of 1948-9 showed considerable deviation from normal is brought out. Table gives average height and extreme tropopause position and temperature at 200 mb. Relation of mean isotach charts to daily isotach charts and year to year variations are also treated. (Same item as 7A-206, Jan. 1956, MAB.) *Subject Headings:* 1. Upper air atlases 2. Isotach charts 3. Northern Hemisphere.—M.R.

9.8-10

551.501.83

§*U. S. Air Weather Service, *Final report on the AWS Sferics Evaluation Project* (1951). Its *Technical Report*, 105-102, Aug. 1954. 152 p. 165 figs., table, 6 refs. DWB—This manual contains a summary of many of the important results of the "Sferics Evaluation Project" initiated by SVERRE PETTERSEN in 1950 and begun on Feb. 1, 1951, using the facilities of the Air Weather Service Caribbean Sferics Net with stations in Puerto Rico, Bermuda, MacDill Air Force Base (Florida) and Robins Air Force Base (Georgia). Also a station at Fort Monmouth (N. J.) was used. Numerous monthly sferics distribution charts (June 1950-May 1952), synoptic charts showing relation of fixes to cold and warm fronts, and other charts correlating data obtained are included in the 165 figs. Equipment is illustrated,

data presented in tables and useful relations between sferics fixes and fronts given in a series of generalizations for use of analysts and forecasters. In summer the relations are clear; in winter close attention must be paid to isolated fixes. *Subject Headings: 1. Sferics Evaluation Project 2. Caribbean sferics network. I. Jensen, C. E. II. Petterssen, Sverre.—M.R.*

9.8-11

551.501.1(02)

U. S. Air Weather Service, **Guide for chief observers.** Its *Manual* 55-3, Nov. 1, 1955. 75 p. forms, figs., 6 refs. DWB (M055 U58am)—A cleverly illustrated manual to help chief observers in the U. S. Air Weather Service to more efficient management practices and better observations. The need for coordination with forecasting personnel, for "spit and polish" in keeping up instrumental equipment, for routine checking of equipment and of special duties; problems in dissemination of data, telecommunications codes, plotting, training, administration and supply, job description, etc., are outlined and illustrated with cartoons and actual forms, check sheets, etc. *Subject Headings: 1. Observer's manuals 2. Observer training.—M.R.*

POPULAR SCIENCE AND TECHNICAL WORKS

9.8-12

551.510.53(023)

Zavarina, M. V., **Atmosfera.** [The atmosphere.] Leningrad, Gidrometizdatvo, 1956. 127 p. 16 refs., 54 figs. (incl. photos). Trans. into English available of Sections of this work. DWB (M10 Z39atm)—A popular-science monograph covering briefly the latest basic knowledge of the many and varied phenomena in the troposphere, stratosphere and higher layers of the atmosphere, with schematic diagrams, cross sections and photographs of instruments, equipment, observatories, expeditions, etc. The main headings are: 1) atmosphere and life; 2) meteorological instruments; 3) methods of upper air investigation (balloons, kites, sounding balloons, radiosondes, planes, stratostats, searchlights, radar, rockets and spectral analysis); 4) high atmosphere phenomena (twilight, meteors, noctilucent clouds, aurora, airglow, acoustic and radio wave propagation); 5) composition of atmosphere; 6) water vapor in the atmosphere; 7) temperature of the upper atmosphere; 8) atmospheric layers; 9) ionospheric structure; 10) outer layers of the atmosphere, cosmic rays, etc.; 11) climate of the free atmosphere over the world and to 200 km height (pressure, temperature, humidity, winds, circulation, etc.). *Subject Headings: 1. Upper atmosphere phenomena 2. Popular science books 3. Russian textbooks.—M.R.*

9.8-13

551.5

Den Tonkelaar, J. F., **Middelen en Mogelijkheden der Meteorologie.** [Methods and possibilities in meteorology.] Wereld-book, Amsterdam, No. 64, pub. 1955 by Wereld-book Bibliotheek. 159 p. bibliog. p. 154-156. DWB (M T665m)—A popular survey of the methods and concepts of research and analysis employed by modern meteorologists and the possibilities resulting from their utilization. The contents include the following: a brief history of meteorology; meteorological instruments—including radiosonde, radar, etc.—for investigating the atmosphere; weather stations, observation procedures and types of observations; weather maps, their construction and meaning; weather prediction—short and long range and the activities, services and scope of meteorology including issuance of forecasts of storm warning, avalanche forecasting, aviation weather forecasting, etc. *Subject Headings: 1. Meteorological research 2. Weather forecasting 3. Meteorological instruments.—I.L.D.*

9.8-14

551.510.535(023)

Harang, Leiv, **De høyeste luftlags fysikk: undersøkelsesmetoder og resultater.** [Physics of the upper atmosphere: research methods and results.] Oslo, O. Norli, 1953. 30 p. DLC (QC879.H27)—A short popular pamphlet giving information (with no mathematics, statistics, diagrams or illustrations) on the various ionospheric layers and the methods of exploring them (meteorites, radio etc.). *Subject Headings: 1. Ionosphere 2. Popular science books.—M.R.*

MONOGRAPHS

See also: **Climate, Canary Islands** (Ceballos y Fernández de Córdoba, Ortuño Medina), 9.8-77; **Carbon monoxide poisoning** (Effenberger), 9.8-90; **Climate of Death Valley, Calif.** (Sissenwine et al.), 9.8-94.

9.8-15

551.507.321.2

Mantis, Homer T., **Accuracy of the Signal Corps transponder system of balloon positioning.**

Minnesota. Univ. School of Physics, Contract NONR 710(22), Technical Report (Unnumbered), Sept. 1957. 26 p. 6 figs., tables, 5 refs., 7 eqs. DWB (M07.321.2 M665ac)—The accuracy of the new Signal Corps balloon ranging device, the transponder, has been evaluated by comparing the balloon positions determined with the instrument with those determined by photography. The standard deviation of the slant-range measured by the transponder was estimated to be of the order of 20 yds. This positioning accuracy would appear to be adequate for studies of meso-scale motions, if the velocity is measured over intervals as great as one minute. *Subject Headings:* 1. Balloon ranging equipment 2. Transponders.—*Author's abstract.*

9.8-16

551.577.38:551.509.617:551.509.3

*Noble, Gontran and Lebrija Celay, Manuel, **Le sequia en México y su prevision.**

[Drought in Mexico and its forecast.] *Sociedad Mexicana de Geografía y Estadística, Boletín*, 83(1/3), Jan./June 1957 and 84(1/3), July/Dec. 1957. 2 vol. (937 p.) numerous figs., graphs, tables. DWB. Also, **La sequia en México y su prevision.** [Drought in Mexico and its forecast.] *Ingeniería Hidráulica en México*, Mexico City, 10(4):85-98, Oct./Dec. 1956. 49 figs., 2 graphs, table. DWB—The first 33 pages of this voluminous work deal with quantitative long range forecasting of drought in India and Japan (WALKER and Co-CHIN CHU, respectively). From p. 34-240 there is a comprehensive study of the synoptic weather patterns resulting in drought (as represented by a reversal of the normal seasonal patterns which give frequent or heavy rains at the times when they are economically mandatory). Historic droughts and hurricanes (bringing heavy rains) are discussed and illustrated by numerous charts. A chronological list of weather events causing losses to agriculture in Mexico from 1610-1951 is found on p. 122-173. Studies based on statistical analysis of precipitation records for the purpose of forecasting drought (cycles) are found on p. 174-240. A detailed study of the history of the Mexican meteorological work and charts and discussion of other climatic elements (temperature, frost, etc.) and their effect on agriculture; artificial rainfall experiments, etc. are found on p. 241-344. Irrigation and groundwater comprise the subject matter for the next chapter (p. 345-436), and other agricultural factors the remainder of the two volume work. The second article, from *Ingeniería Hidráulica en México*, is a reproduction of a part of the book which was entitled, **Análisis de algunas sequias registradas en el país a partir del año de 1875.** It contains detailed analysis of mean synoptic patterns and particular situations which result in drought in Mexico. Examples of the most serious droughts since 1870 are studied to show synoptic and isohyetal conditions during a number of specific months as represented by charts. Graphs show time variations in mean annual precip. at several stations in Mexico and elsewhere (1901-50). *Subject Headings:* 1. Drought, Mexico 2. Artificial precipitation, Mexico 3. Drought forecasting 4. Mexico.—M.R.

9.8-17

551.506.8:633.14

*Nuttenson, M. Y., **Rye-climate relationships and the use of phenology in ascertaining**

the thermal and photo-thermal requirements of rye. Based on data of North America and some thermally analogous areas of North America in the Soviet Union, Finland, Poland and Czechoslovakia. Study sponsored by Contracts CWB 8737 and 9094, Wash., D. C., American Institute of Crop Ecology, 1958. 219 p. 17 figs., 87 tables, 114 refs.—A sizeable book giving in presentable form a great deal of data on rye phenology in North America and in analogous regions of Finland, U.S.S.R. and Czechoslovakia. Degree days above 40°F and summations of photo-thermal units are used as indexes to determine the year-to-year, latitudinal, altitude and local variations in sowing, heading and ripening of winter and spring rye. Cumulative degree-day growth development curves are presented and tested as a means of predicting dates of heading and ripening by using past climatic records and current weather data. March 1

was found to be as good a date as the emergence date for statistical studies of degree-day or photo-thermal indices. *Subject Headings:* 1. Rye-climate relationships 2. Rye phenology 3. Degree-day crop data 4. USSR 5. North America 6. Finland 7. Czechoslovakia 8. Poland.—*M.R.*

9.8-18

551.521.3:551.571

*Martin, Glen E., *Tables of atmospheric precipitable water for horizontal paths*. U. S. Naval Avionics Facility, NAFI-TP-33, Sept. 1957. 261 p. 11 refs. Mostly tables. DWB (M77 M379ta)—Extensive tables give calculated amounts of precipitable water for horizontal paths one km long at 9 different altitudes (0.5, 1.0, 1.5 . . . 3.5, 4.0 km) and at 4 radiosonde stations (Columbia, Mo.; Hatteras, N. C.; Pittsburgh, Pa.; and Washington, D. C., for 4 years; July 1952–Feb. 1956, incl.) for 03 and 15 h each day, also for 09 h and 21 h each day at the last 2 stations. The purpose of the data is for determinations of the water vapor attenuation in infrared radiation transmission. The parameter tabulated is $(\rho/\rho_0)^{\frac{1}{2}} H$ where H is depth of precipitable water and $(\rho/\rho_0)^{\frac{1}{2}}$ the pressure broadening correction factor. *Subject Headings:* 1. Precipitable water data 2. Infrared transmission data 3. Columbia, Mo. 4. Pittsburgh, Pa. 5. Washington, D. C. 6. Hatteras, N. C.—*M.R.*

9.8-19

551.506.8:633.16

†Nuttonson, M. Y., *Barley-climate relationships and the use of phenology in ascertaining the thermal and photo-thermal requirements of barley*. Based on data of North American and of some thermally analogous areas of North America in the Soviet Union, Finland, Poland and Czechoslovakia. Study sponsored by Contracts CWB 8737 and 9094. Washington, D. C., American Institute of Crop Ecology, 1957. 280 p. 14 figs., 122 tables, 119 refs.—A substantial monograph giving detailed data and results of a study of barley-phenology or crop-climate and weather relationships at experiment stations in the major barley-growing areas of the U. S., Canada, U.S.S.R., Poland, Finland and Czechoslovakia. The length of day and temperature summations (degree days) required from March 1 to heading and to maturity are also analyzed and data given for various years and numerous places. Degree days were calculated using 32°, 36°, 40°, 45° and 50°F as bases. A base of 40°F was shown to give the best index. Maps showing locations of stations in both North America and Eurasia, and tables, charts and graphs present detailed phenological and crop climate data for each year in each place. Numerous growth-development curves for barley in terms of degree-day summations, and photo-thermal units are presented for various places. A good bibliography showing sources of data and methods used is placed at the end of the work. *Subject Headings:* 1. Barley-climate relationships 2. Barley phenology 3. Degree-day crop data 4. North America 5. U.S.S.R. 6. Finland 7. Czechoslovakia.—*M.R.*

9.8-20

551.521.18

Olsen, Allen L.; Nichols, L. W. and Regelson, E., *Transmittance of infrared energy: glasses, interference filters, single and polycrystalline materials*. U. S. Naval Ordnance Test Station, NAVORD Report, 5584; NOTW 1786, Oct. 9, 1957. 72 p. 37 figs., 9 tables, 58 refs. DWB (M055 U584no)—The purpose of this report is to present results of an extended investigation on the transmittance of infrared energy by glasses, interference filters, and single and polycrystalline materials in the 2- to 15- μ region. The transmittances of quartz, arsenic trisulfide, silicon, and germanium have been measured in the 0.6- to 2.6- μ range, usually designated as the PbS region. Transmittance measurements of NaCl, KBr, AgCl, and KRS-5 have been extended to 25 μ by use of the KBr prism. The spectral traces serve to delineate these materials as infrared transmitters or wavelength discriminators. An investigation of wavelength cutoffs of germanium-cryolite interference filters shows that a shift from normal incidence moves the pass band in the direction of shorter wavelengths. No attempt has been made to vary the ingredient composition of systems since all materials have been prepared elsewhere. It is not within the scope of this report to discuss losses of infrared energy due to absorption other than to associate absorption bands with chemical impurities. Where possible, losses due to reflection have been calculated. Best available data on pertinent physical and mechanical properties for most of the materials are summarized. *Subject Heading:* 1. Infrared radiation transmittance.—*Authors' abstract.*

GENERAL GEOPHYSICS AND METEOROLOGY

GEOMAGNETISM

See: Diurnal geomag. variations, Polar regions (Mayaud), 9.8-31; Solar-geomagnetic relationships (Herinck), 9.8-263.

IGY

See also: IGY Antarctic program (Popov), 9.8-38; IGY satellite program (Singer), 9.8-57.

9.8-21

551.5:550.3:061.3

Escobar V., Ismael, **Revision de la situación meteorológica en el Hemisferio Occidental para el AGI.** [Review of the meteorological situation in the Western Hemisphere for the IGY.] *Ciencia*, Mexico City, 16(11/12):265-268, 1956. DWB—The general situation of the meteorological network in South America during IGY is reviewed, surface, upper air, ozone, solar radiation and atmos. radioactivity stations discussed and the loss to meteorology in the death of Ing. Don Francisco Rodriguez de Souza, director of the Brazilian meteorological service and President of WMO Regional Association III deplored. *Subject Headings:* 1. South American IGY program. I. de Souza, Don Francisco Rodriguez.—M.R.

9.8-22

551.311.1:550.3:061.3

Barrera V., Humberto (*Chile*), **El programa continental de glaciología.** [The continental glaciological program.] *Ciencia*, Mexico City, 16(11/12):292-295, 1956. DWB—The general glaciological program for IGY national programs (esp. of Chile), coordination of studies in the Western Hemisphere and general recommendations for periods of observation, exchange of data and for general studies are reviewed. *Subject Headings:* 1. IGY glaciological program 2. Glaciological research 3. Western Hemisphere.—M.R.

9.8-23

550.38:550.3:061.3

Giesecke, Alfredo A., Jr. (*Peru*), **El programa de geomagnetismo en las Américas durante el AGI.** [Geomagnetism program in the Americas during the IGY.] *Ciencia*, Mexico City, 16(11/12):298-303, 1956. 3 figs., 4 tables. DWB—A list of 3 permanent geomagnetic stations in the 6 zones of the Western Hemisphere and a list of 49 temporary stations with geographic and geomagnetic coordinates accompanied by a description of the national networks and stations, is included in this report on the geomagnetic program for IGY. Existing and proposed permanent stations are shown on a pole-to-pole map of the Western Hemisphere, types of observations at non-permanent stations shown on another such map and Antarctic geomagnetic stations of several types on a third chart. *Subject Headings:* 1. IGY geomagnetic program 2. Geomagnetic networks 3. Western Hemisphere.—M.R.

9.8-24

551.521.64:550.3:061.3

Camerini, H., **Rayos cosmicos.** [Cosmic rays.] *Ciencia*, Mexico City, 16(11/12):296-297, 1956. DWB—Importance of high altitude observations of cosmic rays during the IGY is stressed, with special reference to plans for satellite observations. SANDOVAL VALLARTA, of Mexico, member of CPAGI for Cosmic Rays, makes a number of recommendations regarding the IGY satellite program, e.g., that the orbit be polar rather than equatorial. *Subject Headings:* 1. IGY cosmic ray program 2. IGY satellite program. I. Sandoval Vallarta, Manuel.—M.R.

9.8-25

551.507.362.2:550.3:061.3

Odishaw, Hugh, **The IGY satellite program.** *Ciencia*, Mexico City, 16(11/12):317-322, 1956. DWB—The U. S. IGY satellite program—tracking network, participation of various U. S. agencies, orbit, types of data to be observed (including meteorological data)—is outlined. *Subject Headings:* 1. IGY satellite program 2. Satellite observations.—M.R.

9.8-26

551.507.362.2:550.3:061.3

Hagen, John P., **The satellite program—physical aspects.** *Ciencia*, Mexico City 16(11/12):323-334, 1956. 14 figs. DWB—A model cross-section of the earth's atmosphere to 600 km, the projected orbit, lifetime of satellite at various heights, the Vanguard and its launching vehicle and trajectory and spectral information to be extended by data from the satellite are nicely illustrated and discussed in this comprehensive article on physical data and aspects of the proposed U. S. satellite. *Subject Headings:* 1. IGY satellite program 2. Satellite observations 3. Vanguard rocket and satellite.—M.R.

WMO

9.8-27

551.508.41

Bindon, H. H., **The new barometer conventions and their application to Canadian practice.** *Canada. Meteorological Div., Cir.* 2675, Ins. 66, June 30, 1955. 9+4 p. 3 figs., 16 eqs. DWB—The WMO (CIMO) barometer convention effective Jan. 1, 1955 is given in detail in an appendix to these instructions explaining the convention and its application to Canadian barometer readings. The FORTIN and M.S.C. fixed cistern (Patterson Kew) barometer and its characteristics, scales, corrections for temp. and gravity are described and the theory presented. *Subject Headings:* 1. Barometer conventions 2. Patterson barometer 3. Canadian Meteorological Service.—M.R.

9.8-28

551.5:061.3(6)

Rubiato, J. M., **Second Session of Regional Association I.** *World Meteorological Organization, WMO Bulletin*, 6(2):53-56, April 1957. DWB—Met at Palace of the Cabildo Insular, Las Palmas, Canary Islands, Jan. 21, 1957 under Pres. JACQUES RAVET of Madagascar. Twenty out of 22 members of the African Regional Association were present. Various questions dealt with include upper air observation networks, codes, solar radiation studies, networks and bulletin, the climatic atlas for Africa, ship's observations and hydrometeorology of the arid zones. Ravet was reelected President for the next term. *Subject Headings:* 1. WMO Regional Association I (Africa) meetings 2. Africa 3. Las Palmas, Canaries.—M.R.

ARCTIC AND ANTARCTIC RESEARCH

9.8-29

551.594.5:551.510.62

Little, C. G. (Asst. Dir., Geophysical Inst., Alaska), **Radio wave propagation in the Arctic.** *Alaska. Univ. Geophysical Institute, Contract AF 19(604)-1089, Interim Scientific Report No. 1*, Aug. 15, 1955. 74 p. 23 figs. (incl. photos), 3 tables, 23 refs.—An extensive study of radar echoes from aurora (on 12, 25, 50 and 100 mc), involving correlation with visual aurora (as shown by panoramic photographs made simultaneously at College, Alaska), shows that radio echoes probably come from ionized columns in the immediate vicinity of visible auroral forms, contrary to theory of HARANG and LANDMARK (1954). Sixteen pairs of photographs presented in this report show good agreement as to direction and distance, and the few exceptions are explained as due to abnormally high visible or faint diffuse forms. Three theories concerning the mode of reflection from ionized auroral layers are examined and the one of R. K. MOORE (1952) involving right angle reflection from ionized columns oriented along magnetic lines of force is shown to agree with actual observations of 311 auroral forms from Aug.-Oct. 1954. Greatest concentration is to N by NE (geomagnetic) and about 600 km distant. None occur overhead and few to the S. Theoretical distribution chart gives nearly same pattern. Attempts at using longer waves (than 106 mc) have thus far been unsuccessful. Experiments on a microwave link 25 mi long failed to show any meteorological influence (ducts). Most winter time ducts are too close to ground to be of any use with normal equipment which sticks up above the duct. An all-sky camera has been used for a year at College and for a shorter time at Pt. Barrow; analysis of the 180° bends show that these are very frequent (105 cases), with openings to W just before midnight and to E at 0300 being most frequent. Movements of bends to E or W were more random than theorized by MEINEL and SCHULTE (1953) who reported only westward drifts during evening and eastward during morning hours. A good correlation was found between intensity of auroral light and E.

onization. Whistlers were studied with special equipment and comparison will be made with those at lower latitudes (Corvallis, Ore. and Stanford) to see if dispersion is much greater in high latitudes as predicted. Between July 1 and 10, 1955, 38 whistlers were recorded. Abnormal TV signal reception and scatter was observed over high peaks of Alaska Range. *Subject Headings:* 1. Auroral studies 2. Whistlers 3. Tropospheric radio wave propagation 4. College, Alaska. I. Alaska. Univ. Geophysical Institute.—M.R.

9.8-30

551.506.5:551.586:598:45

551.506.5:551.584:598.816

*Rivoliér, Jean, *Terre Adélie 1952: éléments de climatologie biologique dans l'Archipel de Pointe Géologie*. [Adélie Land 1952: elements of biological climatology in the Pointe Géologie Archipelago.] *Expéditions Polaires Françaises, Expéditions Antarctiques: Résultats Scientifiques* No. S, V (Meteorology), 1955. 53 p. 17 figs., 12 photos. French, English and German summaries p. 47-50. DWB (M86 R616te)—Meteorological data (average, maximum and minimum temperature, wind direction and speed, pressure, humidity, hours of sunshine, daylight auroras, blizzards and snowfall) obtained at 2 points on the Ile de Petrels, Pointe Géologie (66°40'S, 140°01'E), Adélie Land are analyzed and presented in detail in graphs, charts and tables. The 2 points were 1) the regular meteorological station (4 observations daily), and 2) the Emperor Penguin Rookery (1 observation daily). At the latter point temperature (thermograph), wind at ground, 1 m and 2 m height, and sunshine were recorded. Lowest temperature was -38°C, summer temperature about -4°C. Wind speeds were higher at the main station than at any level at the Rookery. Furthermore the grouping of the penguins during a blizzard reduces the wind and raises the temperature within the Rookery. Many photos show bird life and effect of blizzards thereon. Notes on effect of climate on human beings are included. *Subject Headings:* 1. Bioclimatology 2. Rookery microclimate 3. Pointe Géologie, Adélie Land 4. Ile de Petrels, Adélie Land.—M.R.

9.8-31

550.384.4:551.594.52

Mayaud, P. N., *Activité magnétique dans les régions polaires*. [Magnetic activity in the polar regions.] *Annales de Géophysique*, Paris, 12(1):84-101, Jan./March 1956. 12 figs., 5 tables, 16 refs. At head of article: Rapports scientifiques des Expéditions Polaires Françaises S IV 2. DLC—Some of the records obtained at Terre Adélie are reproduced. An analysis of both hemispheres based on data from 52 stations, reading from 80°N (Thule) to 78°S (Little America), shows the diurnal variations of geomagnetic activity as a function of geomagnetic inclination. Isolines are compared with auroral frequency. A comparison with the CHAPMAN-FERRARO theory is made. *Subject Headings:* 1. Diurnal geomagnetic variations 2. Auroral frequencies 3. Polar regions.—A.A.

9.8-32

551.311.17

Schell, Irving I., *The problem of the iceberg population in Baffin Bay and Davis Strait and advance estimate of the berg count off Newfoundland*. *Journal of Glaciology*, 2(11):58-59, March 1952. table, 4 refs. DWB—Describes an attempt to improve forecasts of ice conditions off Newfoundland by taking account of speed, direction and temperature of Labrador Current and number of icebergs to N.E. Tracking icebergs by color marking them is suggested. *Subject Headings:* 1. Iceberg forecasting 2. Newfoundland.—C.E.P.B.

9.8-33

91.04(99)

551.506.5:551.582.2(99)

Schytt, Valter, *Die norwegisch-britisch-schwedische Antarktisexpedition 1949 bis 1952*. [Norwegian-British-Swedish Antarctic Expedition, 1949-1952.] *Die Erde*, Berlin, No. 3/4:179-194, 1953. figs., photos. DWB, DLC—After describing the purpose and details of the Expedition, a chapter on the meteorology and one on glaciology (snow accumulation, ablation, shelf ice conditions and heat exchange of the ice) give brief description and some quantitative data obtained from the observations made at Maudheim in 1949-52. Further observations made inland on glaciers are described in subsequent chapters. The lowest temperature recorded in the upper atmosphere was -90°C at 10-12 km (at a partly defined tropopause) during winter. Surface observations were every 3 hours except at 3 a.m. *Subject Headings:* 1. Maudheim Expedition, 1949-1952 2. Climate of Antarctica 3. Maudheim, Antarctica.—M.R.

9.8-34

551.501.9

Sykes, R. B., Jr. (*U. S. W. B.*), **Weather stations in the far north.** *Weatherwise*, 5(4):75-77, 84, Aug. 1952. 4 figs. DWB—The weather unknowns in the North American Arctic are being reduced through a joint Canadian-United States project begun five years ago. This program has led to the installation and operation of weather stations at Alert, Eureka, Isachsen, Mould Bay and Resolute (chart shows station locations). This account, with Alert (lat 82°30'06"N, long 62°19'47"W) as an example, describes the mail delivery, history of Arctic exploration in the area, establishment of the station, staff, weather observing program, transmitting of data, special scientific work, observation of animal and bird life and temperature regime. *Subject Headings:* 1. Arctic weather stations 2. Canadian Arctic.—*M.L.R.*

9.8-35

91.04(98)

Burkhanov, V. F., **Sovetskie issledovaniia Arktiki.** [Soviet explorations of the Arctic.] *Priroda*, Moscow, 46(5):21-30, May 1957. charts, photos. DLC—A lengthy informative article on the Soviet work in the Arctic during 1956, preparatory to IGY. Work of the aero-survey of the western Arctic (Pack Ice) where a network of 150 stations was occupied for oceanographic, glaciological and meteorological observations, the results of the SP-3, SP-4 SP-5 and SP-6 drifting stations in the Central Arctic, the high latitude marine expeditions which made surveys from N.E. Greenland to Spitsbergen, drift of ice in Arctic Basin, glaciological work on Franz Josef Land and other research projects are described and illustrated with charts and photos. *Subject Heading:* 1. Arctic exploration.—*M.R.*

9.8-36

551.58(98)

U. S. Air Weather Service, **Notes on forecasting for re-supply operations to Canadian Arctic stations, 1951.** Its *Technical Report*, No. 105-83, Nov. 1951. 17 p. Photostat. DWB (M055 U58a)—Typical weather situations and usual weather development at the Canadian Arctic locations Resolute Bay, Mould Bay, Isaachsen, Eureka Sound and Alert Bay and at Thule on the west coast of Greenland are discussed. Particular attention is paid to special situations affecting flight operations, such as haze, cloud cover, twilight, convection and blocking effects. The study is offered as background information to forecasters assigned to the area. *Subject Headings:* 1. Meteorological elements 2. Canadian Arctic. I. Sanderson, Robert W.—*G.T.*

9.8-37

551.507.2:551.506.3

*Japan. Meteorological Agency, Tokyo, **Meteorological data of the Antarctic Ocean, Vol. 1, Statistical data observed on board the Japanese whaling ships for 10 years commencing 1946.** Issued Sept. 1957. 38 p. 2 figs., 10 tables. DWB (M06.3/269 J35m)—All meteorological observations made on Japanese vessels in the Antarctic seas are presented in raw form or as statistical summaries, and data showing the relation between weather conditions and whaling operations. Such data have been collected by Japanese whalers for 30 years. Experienced observers and forecasters have been on board ships since World War 2. Part of the data have been published in its **Results of Marine Meteorological and Oceanographical Observations.** The first volume of this new series presents the climatic statistics derived from the data published hitherto. Later issues will include more recent raw data as well as summaries. Tables include: 1) monthly mean pressure, air and sea temp. and dew point; 2) frequencies of pressure and air temp.; 3) Frequencies of surface water temperature and dew point; 4) frequencies of visibility, cloud amount and present weather; 5) frequencies of efficiency of whaling operations; 6) maximum wind velocity by month; 7) 10-day and 8) 5-day mean atmospheric pressure, air and water temp. and dew point, hourly frequencies of visibility, weather and wind speed. *Subject Headings:* 1. Meteorological data 2. Antarctic Ocean.—*M.R.*

9.8-38

551.506.22(99)

Popov, L. I., **Tret'ia Antarkticheskaia konferentsiia.** [Third Antarctic Conference.] *Meteorologiya i Gidrologiya*, No. 12:62, Dec. 1956. DWB, DLC—A brief report on the Third Antarctic Conference of the IGY that was held in Paris during 30 July-3 Aug. 1956. The scientific reports of the conference and the resolutions adopted are summarized. Particular

attention was given to the organization of observation networks in the Southern Hemisphere as. *Subject Heading: 1. IGY Antarctic program.—I.L.D.*

9.8-39

551.502.21:550.3:681(09)

†Sucksdorff, E. (*Finnish Met. Office*), **The Geophysical Observatory Sodankylä.** *Geophysica*, Helsinki, 5(1):17-47, 1952. 21 figs., foot-refs., bibliog. p. 47. DWB—Meteorological observations have been made in Sodankylä, Finland, since 1852, and continuously since 1908. The Geophysical Observatory was built in 1913 and operations began Jan. 1, 1914, with KERÄNEN as Chief (1913-17). In the first International Polar Year (1882-4) a temporary observatory under Prof. Selim Lemström's direction, made many geophysical observations and studies. For over 10 years (1914-24) this was the most northerly observatory in the world and the only permanent one within the Arctic circle. Some of the records were saved when the observatory was evacuated on Sept. 15, 1944, but the Germans destroyed all 11 buildings and accidentally the library and most of the equipment and archives. The observatory has been partially rebuilt, and after interruptions of 3 months to a year most of the work has been resumed. Geomagnetic, earth current, induction current, atmospheric electricity, auroral potential gradient, solar radiation, aerological and meteorological observations, instruments and publications are described and the buildings and sites illustrated. *Subject Headings: 1. Geophysical observatories 2. Arctic observatories 3. International Polar Year 1882-1883 4. Sodankylä Observatory 5. History of observatories.—M.R.*

9.8-40

550.3:551.46(268)

Kielhorn, W. V. and Palmer, C. A., Jr. (*both, Geophysics Branch, Office of Naval Research*), **Skijump operations.** *Weatherwise*, 5(4):83-84, Aug. 1952. 2 figs. DWB—Skijump II was carried out in Feb. 1952 by the Geophysics Branch of the Office of Naval Research to obtain geophysical data on the Arctic Ocean. A Douglas DC-3 was used as a laboratory for making various oceanographic and meteorological measurements and two Lockheed Neptunes were used as flying tankers to extend the range of the DC-3 and to fly cover. Five stations were occupied (map shows their locations and the location of floating Ice Island T-3) and oceanographic instruments were lowered through the ice. The data gathered are being analyzed at Woods Hole. *Subject Headings: 1. Project Skijump 2. Oceanographic research 3. Arctic Ocean.—M.L.R.*

SERVICES, INSTITUTIONS, AND OBSERVATORIES

See: Met. Soc. of Japan, 9.8-2; Barometer conventions, Canada (Bindon), 9.8-27; Arctic observatories (Sucksdorff), 9.8-39; Met. service development, U.S.S.R., 9.8-41; Agromet. services, Bonn (Seemann), 9.8-71.

SOCIETIES AND CONFERENCES

See also: Storm surge symposia, Wormley and London, 1957 (Saint Guily), 9.8-169; Cloud physics conf. (Nikandrova), 9.8-212.

9.8-41

551.5:061(09)

Obrashchenie uchastnikov soveshchaniia aktivna rabotnikov gidrometeorologicheskoi sluzhby SSSR ko vsem inzhenerno-tekhnicheskim i nauchnym rabotnikam, nabludateliam, rabochim i sluzhashchim gidrometeorologicheskoi sluzhby Sovetskogo Soiuza. [Appeal by participants of the Conference of the Employees Committee of the Hydrometeorological service of the U.S.S.R. to all engineering-technical and scientific personnel, observers, workers and employees of the Hydrometeorological Service of the U.S.S.R.] *Meteorologiya i Gidrologiya*, Moscow, No. 8:3-8, Aug. 1956. DWB, DLC—At this meeting, the members of the Soviet Hydrometeorological Service examined the course of development of hydrometeorological service and the quality of its service to the national economy. Various defects found in training, observational methods, instrument production, etc. were noted but the forecasting of weather was particularly inadequate. Good weather forecasting is hindered by inadequately

administered weather stations, poorly qualified administrative personnel, defects in communications, etc. rather than in meteorological techniques or in quality of meteorological personnel. For the sixth Five-Year Plan the following programs should be established in order to improve weather forecasting: expand research in agricultural meteorological forecasting; improve equipment of hydrometeorological stations, especially for visibility measurement; soil moisture measurement; summarize and analyze existing available meteorological data; scientific workers should examine in what way the weather service could best help various aspects of the national economy on local as well as national levels; to extend research in the applied aspects of meteorology; improve communication by extending teletype transmission of observations; introduce facsimile transmissions of weather data and charts, etc. *Subject Headings*: 1. Meteorological service development 2. U.S.S.R.—I.L.D.

9.8-42

551.58:061.3

Pastukh, V. P., *Sessia Uchenogo soveta Glavnoi geofizicheskoi observatorii, posviashchennaia sorokaletiiu so dnia smerti A. I. Voelikova*. [Session of the Academic Council of the Central Geophysical Observatory on the occasion of the 40th anniversary of A. I. Voikov's death.] *Meteorologiya i Gidrologiya*, No. 5:61-64, May 1956. DWB, DLC—This meeting was held during Feb. 1-4, 1956 at the All-Union Geographical Society in Leningrad. The sessions were attended by climatologists, agricultural and synoptic meteorologists, hydrologists, etc. Summaries of the various lectures delivered are presented. These dealt with the significance of VOIKOV's concepts in modern climatology (A. A. GRIGORIEV), the climatic conditions of atmospheric humidification (M. I. BUDYKO), contemporary views on the general circulation of the atmosphere (Kh. P. POGOSIAN), papers on the monsoon, on climatic changes, etc. *Subject Headings*: 1. Climatology conferences 2. Voikov, A. I. 3. U.S.S.R.—I.L.D.

EDUCATION, HISTORY AND BIOGRAPHY

HISTORY

See also: History of climatology, Mexico (Stevens-Middleton), 9.8-244.

9.8-43

551.506.3(41/2)

Manley, Gordon, *Early meteorological journals: some further notes*. *Royal Meteorological Society, Quarterly Journal*, 84(359):75-77, Jan. 1958. DWB, DLC—Three early meteorological registers discovered by the Society's Librarian are described: 1) a weather record by SAMUEL WINTER (1703-1787) for Stratford on Avon and Warwickshire and the Midlands, from various journals and from business records and correspondence, covering the author's entire life; 2) records of WILLIAM MITCHELL (1749-1820) for a farm at Auchnagathle on the slopes of Bennachie 20 mi N.W. of Aberdeen, Scotland (elev. 500 ft) and 3) a journal kept by a farmer, DAVID WYLIE, at Busby 6 mi W.N.W. of Perth, Scotland (389 ft elev.) for 1823-1849. A number of picturesque local adjectives describing the weather are commented on. *Subject Headings*: 1. Historic weather records 2. Meteorological registers 3. Scotland 4. Stratford-on Avon, Eng.—M.R.

9.8-44

551.5:8

Dufour, L., *Les écrivains et la météorologie: Chateaubriand*. [Writers and meteorology: Chateaubriand.] *Ciel et Terre*, Brussels, 72(7/8):344-346, July/Aug. 1956. Also: *Les écrivains et la météorologie: René Boylesve*. [Writers and meteorology: René Boylesve.] *Ibid.*, 73(3/4):211-213, March/April 1957. DLC—A few passages are reproduced from the writings of CHATEAUBRIAND as examples of his remarkable ability to describe natural phenomena both in their serene and turbulent aspects. Popular weather maxims he used are quoted. It is also shown that CHATEAUBRIAND was not thoroughly familiar with the fundamentals of atmospheric physics. BOYLESVE, who wrote at the end of the 19th and the beginning of the 20th century, had little interest in the physical aspects of meteorology, but the emotional impact of weather is not negligible in his writings. *Subject Headings*: 1. Meteorology in literature 2. Chateaubriand, François René de 3. Boylesve, René.—G.T.

BIOGRAPHY

See: von Humboldt's work in Mexico (Stevens-Middleton), 9.8-244.

BIBLIOGRAPHY

9.8-45

551.5:016

†Akademii Nauk SSSR. Komitet po Geodezii i Geofizike, *Soobshchenie o nauchnykh rabotakh po meteorologii-Predstaviatsia v Mezhdunarodnuui Assotsiatsiiu Meteorologii k XI General'noi Assembled Mezhdunarodnogo Geodezicheskogo i Geofizicheskogo Soiuzu.* [Bibliography of scientific reports in meteorology presented at the XI General Assembly of the I.U.G.G. Association of Meteorology.] Pub. Moscow, 1957. 50 p. 6 sections, each with bibliog.—The pamphlet lists 9 textbooks and 4 major scientific monographs, about 450 articles on climatological subjects, 200 on synoptic meteorology, 102 on dynamic meteorology, 153 on atmos. optics and actinometry, 78 on cloud and precip. physics, and 72 on micrometeorology and atmos. turbulence. A two or three page review on various sub-topics of each of the above topics, with references to citations in the subsequent bibliography is included in each case. Most of the articles cited are from the *Transactions (Trudy)* of the various scientific research institutes (1952-56) and not from the regular journals. *Subject Headings:* 1. **Bibliography of Soviet meteorology.** I. I.U.G.G. Association of Meteorology, Toronto, 1957.—M.R.

9.8-46

551.48:016 551.46:016

†Deutsche Hydrographische Zeitschrift, **Hydrographische Bibliographie.** [Hydrographic bibliography.] (Reprints of these bibliographical sections of corresponding numbers), Vol. 9, No. 1-6, 1956. Each section with original paging. Author index at end. **DLC**—The arrangement of the entries within each section is by subject, general oceanography, observations, research vessels, expedition reports, physics, chemistry, water masses, waves, ice, etc., and geomagnetism in its various aspects; technical physics and, finally, "nautics" (time, geodesy, cartography, hydrography, harbors and coasts and navigation). Entries are mainly by periodical or journal, but authors are cited in most instances and an author index of more than 3000 authors is appended. No annotations are provided. *Subject Headings:* 1. **Hydrography bibliographies** 2. **Oceanography bibliographies.**—M.R.

9.8-47

551.509.6:551.574.1:016

Thuronyi, Geza; Sze, Marina and Nupen, Wilhelm (*comps.*), **Bibliography on weather modification and cloud physics.** Ed. by Malcolm Rigby. (In: **U. S. Advisory Committee on Weather Control, Final Report, 1957.** 2:322-409. 2259 items. Author, subject and geographic indexes.) **DWB, DLC**—Several bibliographies on cloud physics, cloud seeding, atmospheric nuclei, radar cloud physics and weather modification published in **MAB** were combined and scores of new items from all over the world were added to compile this author-title-journal bibliography of 2259 items, plus an author, subject and geographic index. Citations are arranged chronologically within the 6 major subject areas (corresponding to the major chapters in the **Final Report**). These headings are: I. Texts and general works; II. Statistical evaluation of cloud seeding operations and potentialities; III. Physics of cloud and precip.; IV. Legal aspects; V. Economic aspects; VI. Special hail, lightning, cloud and fog suppression and atomic explosion effects. Under Sec. III there are 7 sub-headings: 1. Cloud seeding theories, 2. Nuclei, 3. Formation and properties of cloud particles, 4. . . . of clouds, 5. . . . of precip., 6. . . . thunderstorms, 7. Radar cloud and precip. studies. *Subject Headings:* 1. **Weather modification bibliographies** 2. **Cloud physics bibliographies.**—M.R.

9.8-48

626:016:8.03

†American Society of Civil Engineers. Hydraulics Division, **List of translations of foreign literature on hydraulics, prepared by its Committee on Research.** Joe W. Johnson, Chairman. N. Y., 1957. 81 p. (*ASCE Manuals of Engineering Practice*, No. 35.) **DWB** (016 A498L)—Over 600 papers on hydraulics translated into English by various agencies (mostly from German or French) are listed in an author arrangement with a subject index added. Some subjects of interest to hydrologists are covered, such as discharge measurement, evaporation, floods, ground water, percolation, water supply and wave motion. *Subject Headings:* 1. **Hydraulics bibliographies** 2. **Translations.**—G.T.

9.8-49

551.582:016(729.1)

†Grimes, Annie E. (*comp.*), **Bibliography on the climate of Cuba, prepared by the Foreign Area Section of the Office of Climatology.** Wash., D. C., U. S. Weather Bureau, Oct. 2, 1956. 23 p. 66 refs. Mimeo. Also her: **Secondary bibliography on the climate of Cuba.** (1956). 13 p. 48 refs. Mimeo. **DWB**—These 2 bibliographies contain 114 annotated references to articles or sources of data on the climate of Cuba arranged alphabetically by author, with systematic (UDC) and alphabetical subject heading indexes. General sources are indicated on cover. *Subject Headings:* 1. Bibliography on climate of Cuba 2. Climate of Cuba 3. Cuba. I. U. S. Weather Bureau.—*M.R.*

9.8-50

551.582.2:016

†Canada. Dept. of Mines and Technical Surveys. Geographical Branch, **Canadian urban geography.** Its *Bibliographical Series*, No. 13. Rev. ed., May 1957. 100 p. Price: 50¢. First edition issued 1954. 80 p.—An extensive list of >1000 unannotated references to articles or works on the cities and towns of Canada, arranged alphabetically by provinces for general studies and by cities or towns for local studies. Many works with climatological material are cited. *Subject Headings:* 1. Climate of Canadian cities 2. Urban geography bibliographies 3. Canada.—*M.R.*

APPLIED METEOROLOGY

ASTRONAUTICS—SATELLITE OBSERVATORIES

See also: IGY cosmic ray program (Camerini), 9.8-24; Earth satellite obs. (Odishaw), 9.8-25; IGY satellite program (Hagen), 9.8-26.

9.8-51

551.507.362.2

Peterson, A. M. et al. (*all, Stanford Research Inst., Menlo Park, Calif.*), **Radio and radar tracking of the Russian earth satellite.** *Institute of Radio Engineers, N. Y., Proceedings*, 45(11):1553-1555, Nov. 1957. 5 figs., table. **DLC**—Brief account of techniques employed and results obtained at the Stanford Research Institute. Experimental measurements with hastily assembled equipment—now improved—appear to yield valuable scientific data on the upper atmosphere. *Subject Heading:* 1. Satellite tracking.—*W.N.*

9.8-52

551.507.362.2

Raimond, J. J., Jr., **Kunstmanen in de maak.** [Artificial satellites in the making.] *Hemel en Dampkring*, 56(1/2):1-13, Jan./Feb. 1958. 12 photos. **DLC**—Description of the various stages in the production of a satellite. The author calls attention to the precision required in constructing a satellite and explains the reason for its brightness. A dozen photographs clearly illustrate the various stages of production. *Subject Heading:* 1. Artificial satellites.—*A.V.*

9.8-53

551.507.362.2

Roberson, Robert E. (*North Amer. Aviation, Bellflower, Calif.*), **Orbital behavior of earth satellites, Pt. 1.** *Franklin Institute, Philadelphia, Journal*, 264(3):181-202, Sept. 1957. 4 figs., table, 13 refs., 41 eqs. **DWB**—Although the methods of classical astronomy are applicable to the analysis of orbits of close satellites, a need has existed for a treatment of intermediate accuracy of the effect of the oblateness of the earth, a major perturbation source under these conditions. This paper reviews some of the more recent contributions toward this goal, compiles a number of orbital results of value in satellite engineering, and discusses some of the perturbation sources on a satellite orbit. It develops a solution of first order in the oblateness for orbits about an oblate spheroid by a method similar to HANSEN's classical perturbation method. Particular attention is given to the effect of initial conditions on the orbit elements. *Subject Heading:* 1. Satellite orbits.—*Author's abstract.*

9.8-54

551.515.81:534

Resler, E. L., Jr. and Cary, B. B. (*Univ. of Maryland, College Pk.*), **Dissociation of air behind strong shock waves.** (In: *The threshold of space*, ed. by M. Zelikoff. N. Y., Perammon Press, 1957. p. 320-327. 5 figs., 6 refs., eqs.) **DLC**—An instrument combining the interferometer and drum camera has been utilized to study the approach to equilibrium behind strong shock waves in air. It is found experimentally that the density distribution behind the shock wave goes through a maximum while approaching equilibrium. This represents a departure from what has been predicted previously and indicates that the air tends to over-dissociate in approaching equilibrium. A theoretical examination of the processes involved shows that this sort of relaxation effect is possible under the experimental conditions. *Subject Heading: 1. Shock waves.*—*Authors' abstract.*

9.8-55

551.507.362.2

Singer, S. Fred (*Univ. of Maryland, College Pk.*), **The artificial earth satellite: past, present and future.** (1956?) 9 p. Mimeo. **DWB**—A brief article outlining the problem of satellite launching and its uses in astronomy, meteorology (storm tracking, albedo), study of sun, weather control, etc., and details of plans for satellites during IGY. *Subject Heading: 1. Satellite observatories.*—*M.R.*

9.8-56

551.507.362.2

Singer, S. Fred et al., **Soviet missile science profile: M/R's personal report (interviews with) S. Fred Singer, Leon Trilling, Hurd Willett, Michael Michaelis, Albert Parry, Alex G. Korol and Andrew G. Haley.** *Missiles and Rockets*, Wash., D. C., 2(2):61-67, Feb. 1957. ports. **DLC**—Opinions of various experts on rocket development in the U. S., regarding the possible state of development of the Soviet missile program and their earth satellite and the basic science that is necessary for such development. The statements of Russian scientists at IGY meetings in Rome and Barcelona as to the parameters to be measured by the Soviet satellite are given considerable weight. Remarks of SINGER and of WILLETT are of particular interest to meteorologists—the former being quite up to date in his knowledge of Soviet development. *Subject Heading: 1. Soviet satellite development.*—*M.R.*

9.8-57

551.506.22:551.507.362.2

Singer, S. Fred (*Physics Dept. Md. Univ.*), **Why earth satellites?** July 6, 1956. 5 p. Mimeo. At top of p. 1: For IRE Student Quarterly. **DWB**—Short discussion of purpose of the earth satellites to be launched during IGY for geophysical observations above the earth's atmosphere. *Subject Heading: 1. IGY satellite program.*—*M.R.*

GLACIOLOGY AND ICE

See: IGY glaciological research, W. Hemisphere (Barrera), 9.8-22; *Sea ice-temp. correlation, Åland Archipelago* (Rodhe), 9.8-192.

AERONAUTICAL METEOROLOGY

See also: Aeromet. textbooks (Georgii), 9.8-5.

9.8-58

551.506.7:629.135

U. S. Weather Bureau, **Weather reports from pilots: how in-flight reports help others.** *Aviation Series*, No. 14, 1955. 8 p. 5 figs. (incl. photos). Price: \$.05. Originally issued as Map-back article on its Daily Weather Map, Dec. 15, 1955. **DWB**—In spite of the fact that there are some 500 places in the U. S. where observations of the flying weather are made hourly, this network is not dense enough to detect many phenomena which may be vitally important to aircraft operations. Besides that, weather observations of sky cover, ceiling, visibility and related conditions are made from the surface and, therefore, do not always yield satisfactory results. This is why weather information from a pilot observing the weather as he flies is of great importance and should be passed on to others. The paper explains what happens to the pilot's weather report, how it is processed, and what the pilot should report. *Subject Heading: 1. Pilot reports.*—*A.M.P.*

9.8-59

551.509.58:629.13

Burkett, Thomas L. and Gringorten, Irving I., **Integration of weather forecasting, flight planning, and flight watch.** *Institute of the Aeronautical Sciences, Preprint No. 590, 1956*, 24 p. 12 figs. DWB (629.1308 I59p)—Since Oct. 1954 the Atlantic Division of the Military Air Transport Service has been making increasingly frequent use of minimal flight plans using a technique that is quickly taught to operations and flight crew personnel and easily integrated into flight operations. The optimum flight planning procedures not only provide more pertinent information for flight operations but also provide for in-flight correction of flight plans based upon later observed weather information. It has been one of the important advances towards optimum aircraft operations. This paper contains a description of the method and of the associated meteorological procedures. It also includes recommendations with respect to optimum operations of transport aircraft, both civil and military. *Subject Headings: 1. Minimum flight plans 2. Optimum flight plans 3. Flight forecasts.—From authors' abstract.*

9.8-60

551.574.7:629.13

Perkins, Porter J. (*Lewis Flight Propulsion Lab., Cleveland, Ohio*), **Preliminary survey on icing conditions measured during routine transcontinental airline operation.** *U. S. National Advisory Committee for Aeronautics, Research Memorandum, E52J06, Dec. 16, 1952.* 27 p. 11 figs., 3 tables, 3 refs. DWB—The data were collected by four airplanes over a transcontinental route from Jan. through May, 1951. An analysis of the pressure-type icing-rate meter was satisfactory for collecting statistical data during routine operations. Although insufficient for a conclusive statistical analysis, the icing data as obtained on these routine flights provide a greater quantity and more realistic information than that obtained from random research flights. Summary of statistical data will be published when the 1951-1952 icing data and 1952-1953 are processed. The 1951-1952 data already analyzed indicate that a sound basis for ice-protection-system design is feasible by defining the meteorological parameters of the icing cloud. *Subject Headings: 1. Icing of aircraft 2. Icing data.—From Author's abstract.*

9.8-61

551.5:629.13:00

Sokolov, P. A., **O meteorologicheskoy obsluzhivanii grazhdanskogo vozdušnogo flota** [Meteorological service to civil aviation.] *Meteorologiya i Gidrologiya, Leningrad, No. 5:26-28, May 1957.* DWB—In connection with the increased development of high speed civil aviation the Soviet hydrometeorological service has to (1) expand the network of aerological stations and to make more frequent observations to the highest altitudes; (2) elucidate meteorological data on synoptic maps with proper consideration of the short time it takes jet planes to cover large distances; (3) develop forecasting techniques for the upper atmospheric layers; (4) improve the form of meteorological service for airplane flights. A detailed discussion of achieving the goals and special reference to air transport conditions in the U.S.S.R. is presented. *Subject Headings: 1. Aviation meteorological services 2. U.S.S.R.—I.L.D.*

9.8-62

551.508.85:551.501.1

White, Frank C. (*Air Transport Ass'n of America, Wash., D. C.*), **Radar for dangerous weather avoidance.** Presented at Joint ION-RTCA-RTCM meeting held at the Hotel Astor, New York City, Sept. 19, 20, 21, 1950. 8 p. numerous photos. Mimeo. DWB—Early notes on experimental tests and specifications for airborne weather radar (1946-50). Equipment is amply illustrated. *Subject Headings: 1. Air-borne weather radar 2. Radar storm detection.—M.R.*

9.8-63

551.5:629.13:05

Flight Safety Foundation, N. Y., **Private Flying Safety Bulletin, 57-300, June 17, 1957**, 2 p. DWB (M:629.13 F621pr)—In this first of a series of bulletins to be issued by Flight Safety Foundation of New York, such problems as the effect of high temperature and humidity on flight performance, and fuel injection at reduced air density are discussed. Advice is included on the proper use of weather information. *Subject Headings: 1. Aeronautical meteorology bulletins 2. Airplane performance.—G.T.*

MARINE METEOROLOGY AND OCEANOGRAPHY

See also: **Met. data, Antarctic Ocean, 9.8-37; Oceanog. research, Arctic Ocean (Kielhorn, Palmer), 9.8-40; Hydrographic and oceanog. bibliog., 9.8-46; Comfort zones and marine bioclimat. (Malhotra), 9.8-93; Storm surge symposia, Wormley and London, May 1957 (Saint-Guilly), 9.8-169; Sea ice-temp. correlation, Åland Archipelago (Rodhe), 9.8-192.**

9.8-64

551.464/48

Hachey, H. B., **The hydrography of Hudson Bay.** *Royal Society of Canada, Transactions, Ser. 3*, 48:19-23, June 1954. 6 refs. DWB, DLC—In 1930, 500 drift bottles were released in Hudson Bay. Ten % have been recovered, returns coming in up through 1953—all found within the Bay. The location of the bottles confirms the counter clockwise circulation of the surface waters. Hudson Bay is an estuary, with respect to salinity stratification of the water in the bay (the salinity in the surface waters being as low as 23‰ and the 25 m deep water 31‰) and more intensely stratified in James Bay region and less in Hudson Strait, and a maximum in Sept. Mixing occurs in the top 50 m. Below 50 m the temperature is from -1° to -2°C and salinity 32.00 to 33.50‰, with little change from year to year or within a year but from 1930 to 1948 had warmed and become more saline, probably due to increasing replacement by Atlantic waters. *Subject Headings:* 1. Salinity 2. Oceanic influences on bays 3. Hydrography of Hudson Bay 4. Hudson Bay.—M.R.

9.8-65

551.524:551.463

Koizumi, M. (*Met. Research Inst.*), **A note on the diurnal variation of air temperature on the open sea (Researches on the variations of oceanographic conditions in the region of the Ocean Weather Station "Extra" in the North Pacific Ocean, Pt. 6).** *Papers in Meteorology and Geophysics*, Tokyo, 7(3):322-326, Oct. 1956. fig., 3 tables, 2 refs., eqs. DWB—The swelling in the forenoon appearing in the diurnal variation curve of air temperature at Ocean Weather Stations "Extra" (39°N , 153°E) and "Tango" (29°N , 135°E), described in detail in the fourth of the author's present series of studies, may pretty well be explained by considering an adiabatic change due to the diurnal variation of atmospheric pressure. *Subject Headings:* 1. Diurnal temperature variations 2. Temperature variations over sea 3. North Pacific.—*Author's abstract.*

9.8-66

551.5:061(26)

Lake Carriers' Association, **Annual report, 1956.** pub. 1957? 167 p. numerous tables. DWB (386.2 L192a)—Weather Bureau service on the Great Lakes for 1956 navigation season is described on p. 154-160. The season opened on April 2 and closed on Dec. 31. Broadcast stations, changes in wind and weather reporting stations and services, gale warnings issued, a description of the 3 major storms (Nov. 16, Nov. 21 and Dec. 11, 1956), and a summary of activities at the 13 major ports on the Great Lakes, are included. Water levels are discussed on p. 38 and 39. Lake levels at end of 1956 were lower than at end of 1955. Annual precipitation was 1.08 below 1955. Average and 2.69" below average for past 10 yrs as a result levels dropped 3.0 to 11.9 inches and a further drop was predicted for 1957. *Subject Headings:* 1. Great Lakes meteorological services 2. Lake levels 3. Maritime weather broadcasts 4. Great Lakes.—M.R.

9.8-67

551.46:551.521.64

Sea-going cosmic-ray observatory. *Current Science*, Bangalore, 26(6):172, June 1957. DWB, DLC—A note on the collaborative effort being made by the Bartol Research Foundation, the National Research Council of Canada and the Uppsala Univ. Physical Institute to survey the cosmic ray components at various latitudes and longitudes by means of a sea-going observatory installed in the Swedish Motorship "Lommaren" plying between Sweden and S. Africa. A cosmic ray map of the world will eventually be made by the Bartol Research Foundation from this and other IGY cosmic ray data. *Subject Headings:* 1. Marine cosmic ray survey 2. Cosmic ray map of world 3. Motorship "Lommaren" Cosmic Ray Observatory.—M.R.

9.8-68

551.481.1

Vervolob, B. I., **K voprosu o techeniakh v Baikale.** [The problem of currents on Lake Baikal.] *Akademiia Nauk SSSR, Doklady*, 112(2):307-310, Jan. 11, 1957. fig., table, 8 refs. **DLC**—Measurement of water flow below the ice cover was carried out to considerable depths during the beginning of 1955 in Lake Baikal and the results of observations are presented in a table. There was established the existence of currents beneath the ice cover embracing the thickness of water to depths of 450-600 m. Currents may exist also at greater depths. The velocity of the currents at the upper layer (0-50-100 m) attains 6-7 cm/sec but is 5-6 cm/sec in the lower layer (100-600 m). *Subject Headings*: 1. Lake currents 2. Lake Baikal, U.S.S.R.—*I.L.D.*

9.8-69

551.526:551.511

Neumann, J., **On a relation between the annual heat budgets of seas and lakes and other terms of the energy equation.** *Royal Meteorological Society, Quarterly Journal*, 79(342):532-534, Oct. 1953. 3 refs., 8 eqs. **DWB**—Annual heat budget of a sea or lake is examined taking account of variation of Bowen's ratio through the year. Simple approximate expressions are found for oceans in low and high latitudes. *Subject Headings*: 1. Heat exchange 2. Water temperatures.—*C.E.P.B.*

AGRICULTURAL METEOROLOGY

See also: **Rye-climate relationships** (Nuttonson), 9.8-17; **Barley-climate relationships** (Nuttonson), 9.8-19; **Climate, Canary Islands** (Ceballos et al.), 9.8-77; **Drought effects upon crops, U.S.S.R.** (Protserov), 9.8-229; **Meadow climatology, Switzerland** (Primault), 9.8-253; **Efficiency index in agroclimat.** (Rosini), 9.8-261.

9.8-70

551.5:63:634.9

Schnelle, F. (*Offenbach, a. M.*), **Die Meteorologie hilft der Land- und Forstwirtschaft.** [Meteorology aids agriculture and forestry.] *Wetter und Leben*, Vienna, 7(8/11):222, 1955. **DLC**—The author discusses comprehensively and with the aid of numerous examples the contributions to agriculture and forestry that can and are being made by climatology, phenology, local climatology, the climate of the atmospheric layer at the earth's surface, the study of the microclimate of plants, soil climatology, the cooperation between agricultural meteorology and synoptic meteorology, the use of agrometeorological and forest climatological advisory services, animal and human climatology. *Subject Headings*: 1. Agricultural meteorology 2. Forest meteorology.—*I.L.D.*

9.8-71

551.5:633:06

Seemann, J., **Tätigkeitsberichte der Agrarmeteorologischen Dienststellen, Bonn.** [Activity report of the Agrometeorological Office at Bonn.] *Germany. Deutscher Wetterdienst, Mitteilungen*, 2(14):24-30, 1955. 4 figs., 4 refs. **DWB**—The work of the Bonn Agricultural-meteorological service is oriented towards the needs of intensive horticulture carried on in the Northern Rhine region. The investigations include studies on greenhouse climate and plant growth, the use of synthetic foil instead of glass in greenhouses and the temperature of light conditions, heat loss of greenhouses under various types of cover, fruit storage and storage climate. A simple automatic control of ventilation is described with the aid of a photograph. *Subject Headings*: 1. Agrometeorological services 2. Greenhouse climates 3. Bonn, Germany.—*I.L.D.*

9.8-72

631.362:664.82

Senke, Walter, **Künstliche Getreidetrocknung.** [Artificial crop drying.] *Umschau*, 56(23):722-724, Dec. 1, 1956. 4 figs., 9 refs. **DLC**—Reaping and threshing machines speed up harvesting but cut short the natural drying period. Methods of artificial drying by warm air are described and their efficiency discussed. *Subject Heading*: 1. Crop drying.—*C.E.P.B.*

9.8-73

551.586:551.553:633.61

Venkiteshwaran, S. P. and Srinivasan, P. S. (*Met. Office, Poona*), **Lodging of sugarcane in strong winds.** *Indian Journal of Meteorology and Geophysics*, Delhi, 6(2):176-186, April

955. 3 figs., 5 tables. DWB, DLC—The following topics are discussed: varieties of sugarcane and practices to prevent lodging, the season in which sugarcane is grown and harvested, meteorological conditions causing lodging of sugarcane in crop weather observatories, in particular that of the sugarcane crop at Poona on Oct. 6, 1953, evidence of winds exceeding 100 mph over India and suggestions for reducing lodging caused by high winds. *Subject Headings*: 1. Sugarcane lodging 2. Wind effects on sugarcane 3. Poona, India.—I.L.D.

9.8-74

551.586:59 551.577.5:59

†Mota, Fernando Silveira da (*Climatology Sec., Inst. Agrônômico do Sul, Pelotas*), *Contribuição ao estudo da influência das chuvas sobre a distribuição dos bovinos no Rio Grande do Sul*. [Contribution to the study of the influence of rain on the distribution of cattle in Rio Grande do Sul.] *Revista Agrônômica*, Porto Alegre, Brasil, 16(193/198):63-81, Jan./June 1953. table, 40 refs.—Literature on the influence of climate and especially of rain on the population of cattle, yield of milk from dairy cattle, and other aspects of animal climatology is reviewed and data given on climate (KÖPPEN and THORNTHWAITHE classifications) etc., of Rio Grande do Sul. Statistical correlations of various rainfall parameters show that distribution of cattle is inversely proportional to rainfall, especially summer rainfall (-0.8749 ± 0.0025) and number of rainy days in autumn (0.6441 ± 0.06). *Subject Headings*: 1. Animal climatology 2. Rainfall influences on cattle distribution 3. Rio Grande do Sul, Brazil.—M.R.

9.8-75

551.586:633.15

Panina, V. F., *Ob izuchenii agrometeorologicheskikh usloviĭ vozdeleyvaniia kukuruzy v podmoskov'e*. [Study of agrometeorological conditions for raising maize near Moscow.] *Meteorologiya i Gidrologiya*, No. 4:41, April 1956. DWB, DLC—Agrometeorological observations on maize are being carried out at the Sobakino agrometeorological station in the Narоminsk district of the Moscow oblast. A favorable indicator for sowing maize in clay soils is the transition of the soil temperature at a depth of 10 cm through 10°C; over a period of 15 years it was observed to occur on May 15. The period of development from sowing to flowering was in 1954 76-80 days for the Partizanke variety. *Subject Headings*: 1. Agricultural climatology 2. Maize 3. Sobakino, U.S.S.R.—I.L.D.

FOREST METEOROLOGY AND FIRE WEATHER

See also: *Agricultural met.* (Schnelle), 9.8-70; *Windbreak effects on sea salt* (Tamate et al.), 9.8-205; *Forest shelter belts* (Pavlovskii), 9.8-252.

9.8-76

551.5:368.10

Robin, A. G. (*Central Office, Melbourne*), *Weather conditions associated with the Broadford fire*. *Australian Meteorological Magazine*, Melbourne, No. 18:30-43, Sept. 1957. 4 figs., 2 tables, ref. DWB—The behavior of a relatively serious bush fire which broke out on Feb. 25, 1957, near Broadford (Victoria) is described briefly. Estimates of the average linear and areal rates of spread are presented. The preceding seasonal rainfall distribution and climate are discussed in relation to their effect on the amount and degree of curing of light fuels in the district. In a survey of the various features of the synoptic weather sequence, it is shown that the fire flared up under the influence of weather conditions which are not generally considered to be conducive to the spread of serious fires. *Subject Headings*: 1. Fire weather conditions 2. Broadford, Victoria.—*Author's abstract*.

9.8-77

551.582.1(468)

*Ceballos y Fernández de Córdoba, Luis and Ortuño Medina, Francisco, *Estudio sobre la vegetación y la flora forestal de la Canarias Occidentales*. [Study of the vegetation and forest flora of the western Canaries.] Madrid, Ministerio de Agricultura, Instituto Forestal de Investigaciones y Experiencia, 1951. 465 p. 157 figs., plates and charts (some fold., some col.), tables. DLC—The climate of the western Canaries is analyzed and discussed in a more than usually thorough manner on p. 58-91 of this nicely printed and beautifully illustrated and comprehensive volume on the vegetation and forests of the islands of Palma, Tenerife, Gomera and Hierro (lat. 28°N, long. 16°-18°W). The climatic controls (circulation, oceanicity,

elevation and aspect) are first discussed. Tradewinds and winds from the African desert are the chief factors in the climatic regime. Three zones: 1) lower (up to 600–900 m), 2) the cloud zone (900–1500 m), and 3) the upper dry zone (>1500 m) are used as a basis for analysis and discussion of the climate and presentation of graphical and tabular data (temp., humidity, rain, cloud, sunshine, evaporation, thunder, hail, snow and wind). *Subject Headings: 1. Climate of the Canaries 2. Canary Islands.*—M.R.

9.8-78

551.5:368.10:632.18

Countryman, Clive M., **California fire weather severity in 1956.** *U. S. Forest Service California Forest and Range Experiment Station, Forest Research Notes*, No. 118, Feb. 5, 1957. 7 p. 4 figs., 3 foot-refs. DWB (M09.584 U581c)—A graphical comparison of fire weather severity index number for 1956 with 1951–55 average index values shows that in 1956 most rating areas in northern and central California fell into the low or medium classes. It is also shown that the fire weather severity index, although originally designed only for comparison of severity of seasons, can also be used for detecting buildup of severe burning conditions. *Subject Headings: 1. Fire severity indexes 2. Forest fires 3. California.*—G.T.

9.8-79

551.556.2:551.509.61

Daigo, Y. and Maruyama, E., **Experimental studies of windbreaks for protection from frost damage.** *Japan. Meteorological Agency, Tokyo, Memoirs of Industrial Meteorology*, 20(1):1–7, Oct. 1956. 4 figs., 6 refs. In Japanese, English summary p. 7. DLC—Downflows of cold air often occur near the ground on slopes, being cooled by the outgoing radiation in calm winter nights when the atmospheric pressure is high, and the sky clear. Under such circumstances, frost pockets are formed at the bottom of the slopes. Where a wood stand across such a slope, the lee side of the wood on the slope becomes much warmer than the windward, and safe from frost damage compared with other places. To make clear the microclimatological role played by a wood, the authors have observed the temperature distribution on a slope which is provided with three kinds of windbreaks constructed with branches of Japanese cedar, *Cryptomeria japonica*. The inclination of the slope is 6° and the wood windbreaks (model forest) are approximately 1.2 m high. The results obtained are shown in Figs. 2, 3 and 4. It may be seen from these figures that the warm region on the lee side of the wood on the slope is due to the warm air of model forest which has been pushed down to the lee side by the downflow of the invading cold air. *Subject Headings: 1. Windbreaks 2. Frost protection.*—Authors' abstract.

9.8-80

551.5:691.11:551.3.05

Page, Rufus H. and Carter, Roy M., **Heavy losses in air seasoning Georgia Pine and how to reduce them.** *U. S. Forest Service. Southeastern Forest Experiment Station, Asheville, N. Carolina, Station Paper*, No. 85, Nov. 1957. 20 p. 18 figs., 7 refs. DWB (634.9 U583s)—Tabulated data (1955–1956) from twenty lumber yards in Georgia indicate that monetary losses may be reduced by some 80% if correct stacking methods are used. The detrimental influence of hampered air circulation and the trapped moisture result from incorrect stacking hence better seasoning practices are discussed and illustrated here. Protection against weather practical exploitation of air circulation and technical construction of lumber piles are requisite. The local meteorological data are given for comparison with moisture content of lumber stacked. *Subject Headings: 1. Moisture content of lumber 2. Weathering of wood.*—W.N.

9.8-81

551.579.5:614.84

Robin, A. G. (Central Off., Bureau of Met.), **The association between the occurrence of major fires and a synthetic soil moisture index.** *Australian Meteorological Magazine*, Melbourne, No. 17:1–7, June 1957. 6 figs., 2 tables, 9 refs. Also his: *Addendum. Ibid.*, No. 18:55, Sept. 1957. DWB—An attempt has been made to assess the quantity of grass-fuel and their time of curing from records of monthly rainfall and evaporation, and from the occurrence of major fires in the Wagga-Riverina districts of Australia during 1948 to 1955. In simulating a soil-moisture conservation approach the results seem promising but, for lack of certain data, any conclusions are still very subjective. Further development and modifica-

tion of the procedures used will be necessary to produce a satisfactory forecasting aid. A brief review of some of the published methods for assessing soil-moisture conservation is included. From these it may be possible to devise a more satisfactory means for assessing the state of grass-fuels from meteorological data. *Subject Headings: 1. Soil moisture effects on fire occurrence 2. Fire weather.—Author's abstract.*

9.8-82

551.588.1:551.577.52

Tanaka, Kazuo (*Faculty of Agric., Tottori Univ.*), **On the rate of the amount of rain falling through the Japanese black pine young trees.** *Journal of Agricultural Meteorology*, Tokyo, (3/4):112-114, Aug. 1954. 5 figs., table, 5 refs. In Japanese; English summary p. 114. **DWB**—The author set up the equipment, fixing the newly constructed tin receiver to a two or three year seedling of Japanese black pine planted in a pot. The amount of the stem flow and rain falling through the crown was measured at every shower, and the rate of rain falling through the crown was calculated. (1) In case of the three year seedling, the rate of rain falling through the crown was 40-50% in case of 1 mm of the precipitation. (2) The rate of rain falling through the crown gradually increased with the precipitation nearly up to 5 mm but when it was more than about 5 mm this rate seemed to be constant by 90-95%. (3) In case of two year seedling, the rate of rain falling through the crown was greater than that of the three year seedling and it was 60-70% for 1 mm of the precipitation. (4) In general, the rate increased with the precipitation nearly up to 3 mm every shower but when it was more than 3 mm it was about 90-97%. *Subject Headings: 1. Precipitation interception by forests 2. Forest influences.—Author's abstract.*

INDUSTRIAL METEOROLOGY

See also: **Bioclimatic charts** (Olgyay), 9.8-92; **Estimation of solar energy** (Sapsford), 9.8-96; **Mining safety and gas analyzers** (Pritchard), 9.8-119; **Solar energy utilization** (Migeotte), 9.8 180.

9.8-83

621.47:551.521.1

Baum, V. A.; Aparasi, R. R. and Garf, B. A. (*all, Energeticheskii Inst., Akademiia Nauk SSSR*), **High-power solar installations.** *Journal of Solar Energy Science and Engineering*, Phoenix, Ariz., 1(1):6-12, Jan. 1957. 10 figs., 4 refs., eqs. **DWB, DLC**—"Trans. of original Russian in *Teploenergetika* [Thermal Energy], 3(6):31-39, June 1956."—With reference to experimental and developmental work carried on in the U.S.S.R. on the contributions of economical high power of solar radiation, the authors discuss the ratio of construction costs of various elements of a parabolic minor solar installation to the power of the stations and the use of flat mirrors adjusted separately reflecting the light with a boiler is discussed. A detailed analysis of a solar installation in the U.S.S.R. capable of producing 11-13 metric tons/hour of steam ($P=30$ atm., $t=400^{\circ}\text{C}$) is included. "The optical system of the installation consists of 293 mirrors of 3×5 m, mounted on carriages which move on racks positioned around a boiler shield on which the solar rays are focused." With the aid of equations, calculations and diagrams, the authors discuss the azimuthal rotations, the power of the motor, the zenithal rotation, transference number of the mechanism, properties of the optical system, heat loss, heat production, heat efficiency, etc. *Subject Headings: 1. Solar energy utilization 2. Solar generators 3. U.S.S.R.—I.L.D.*

9.8-84

551.521.1:621.47

Bilancini, R., **Piani e realizzazioni per lo sfruttamento dell'energia solare.** [Plans and achievements in the utilization of solar energy.] *Rivista di Meteorologia Aeronautica*, Rome, 7(3):53-54, July/Sept. 1957. **DLC**—Recent information on solar energy utilization is reviewed (according to *Informazione Scientifica*, Vol. 3, No. 98). Plans for several very large solar furnaces have been announced (French Pyrenees, Arizona, New Mexico and Armenia). Other developments include the use of photoelectric cells for direct transformation of solar energy into electricity. *Subject Headings: 1. Solar energy utilization 2. Solar furnaces.—G.T.*

9.8-85

551.521.1:621.4

Bliss, Raymond W. (*Donovan and Bliss, Solar Heating Consultants*), **Notes on performance design of parabolic solar furnaces.** *Journal of Solar Energy Science and Engineering*, Phoenix, Ariz., 1(1):22-29, Jan. 1957. 8 figs., 2 tables, 12 refs., eqs.—The author presents the fundamental equations "applicable to the performance design of a parabolic solar furnace." Using numerous diagrams and equations, the author discusses the following: the solar image formed by a perfect paraboloid, allowances for furnace transmission losses, maximum temperature attainable with solar furnaces, and derivation of equations of perfect paraboloid concentration ratios. *Subject Heading: 1. Solar furnaces.—I.L.D.*

9.8-86

551.586:699.8

Becher, Poul (*Danish Natl. Inst. of Building Research, Copenhagen*), **Thermal insulation in temperate climates.** (In: Building Research Congress, Garston, 1951, *Papers presented in Division 3.* pub. 1951. p. 104-111. 2 figs., 7 tables, 6 refs., 5 eqs.) DWB (624 B932p)—This article contains an exposition of methods for calculating the economic optimum thickness of insulation, which includes formulas for determining the operating costs related to the external walls of buildings, and formulas for and data on the operating cost for solid brick walls with or without window circulation, the economic thickness of insulation for some external walls for small houses, etc.; the determination of the validity of the coefficients; the choice of insulating materials; the carrying out of the insulation, and the authoritative requirements with respect to insulation. *Subject Headings: 1. Thermal insulation 2. Insulation thickness.—I.L.D.*

9.8-87

551.574.42:621.31

Dömök, István, **A szabadvezetékek különleges pótterheinek előfordulása Magyarországon.** [Occurrence of special added loads on free power lines in Hungary, Pt. 1.] *Villamos-ság*, Budapest, 2(8):242-253, Aug. 1954. Pt. 2, *Ibid.*, 2(9):276-282, Sept. 1954. 14 figs., 46 refs. DLC—Weather conditions responsible for the formation of (a) rime, (b) wet (adhesive) snow and (c) glaze are discussed. Severe cases of each of these phenomena, which caused considerable damage to power lines in Hungary in the past decades, are described along with the accompanying synoptic developments. Weather charts, diagrams and other data are presented. *Subject Headings: 1. Icing of transmission lines 2. Hungary.—G.T.*

9.8-88

551.509:624.2

Eremina, V. I., **Opyt gidrometeorologicheskogo obsluzhivaniia stroitel'stva mosta cherez r. Ob' v Novosibirsk.** [Experience with the use of hydrometeorological service in building the bridge across the Ob River at Novosibirsk.] *Meteorologiya i Gidrologiya*, No. 8:45-46, Aug. 1956. DWB, DLC—The author describes the various weather data required and provided during various stages of the construction of the bridge and its approaches. During the first stage when clearing operations and the construction of a concrete plant were carried out daily and monthly forecasts were provided. This was followed by data on the freezing and thawing of the Ob River, height of water level, forecasts of water level, etc. *Subject Headings: 1. Bridge construction 2. Weather forecasting 3. Ob River, U.S.S.R.—I.L.D.*

9.8-89

551.521.11:621.4

Escher-Desrivieres, J. and Grisolle, H., **Contribution à l'étude de l'insolation des constructions habitées au cours de l'hiver, dans la région parisienne.** [Insolation of dwellings in winter in the Paris area.] *La Météorologie*, Paris, No. 42:93-104, April/June 1956. 9 tables, 9 refs., eqs. English and Spanish summaries p. 93. DWB—With particular attention to the use of solar radiation for the heating of dwellings, statistical data are presented on minimum temperatures at Montsouris for the last 20 yrs and lengths of insolation as well as solar radiation intensity at the ground at Park Saint-Maur. In general it is found that the cold days have the largest insolation values and consequently the efficiency of the use of free heat for heating is only slightly influenced by the outside temperature. *Subject Headings: 1. Insolation 2. Solar heating 3. Paris, France.—Authors' abstract.*

MEDICAL METEOROLOGY

See also: Weather effects on diseases (Saenz de la Calzada), 9.8-259.

9.8-90

551.510.42:546.26:612.12

†Effenberger, Ernst, *Das Kohlenoxyd und dessen Bedeutung in der Hygiene*. [Carbon monoxide and its importance in hygiene.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, No. 12, 1957. 128 p. 41 figs., 10 tables. Bibliog. p. 115-128. Mimeo. DWB—Characteristics of CO are described; physiologically important is its almost complete insolubility in water. In nature it occurs only in volcanic, marsh and earth gases; the most important artificial sources are town gas supplies and auto exhausts. Effect of CO on men takes place in respiratory system through its great affinity for haemoglobin, leading to decreased absorption of oxygen. With 0.1% CO in the air 50% of haemoglobin takes up CO. Physiology and pathology are described. Blood samples from 167 Hamburg students are analyzed according to whether they live in busy parts or suburbs, and are smokers or not. Nonsmokers in suburbs, mean content 1.56%, heavy smokers 6.49% CO in blood. This is supported by other researches and an analysis of tobacco smoke. Sec. 4 deals with CO in outdoor air, living and work rooms, tunnels and large garages. A CO chart of Hamburg is compared with a traffic chart and a noise chart. CO in haemoglobin of traffic police before and after 6-8 hours duty in different weather conditions is tabulated. CO content of rooms, tunnels, garages and inside cars, and the blood of their occupants, is discussed. Author next describes a number of methods of measurement of CO in air and haemoglobin, and finally CO poisoning, therapy and protective measures. *Subject Headings: 1. Carbon monoxide in the atmosphere 2. Carbon monoxide poisoning.—C.E.P.B.*

9.8-91

551.586:599

Davis, David E. (*School of Hygiene and Public Health, Johns Hopkins Univ., Baltimore*), *The frequency of reduction of rat populations by weather*. *Ecology*, Durham, N. C., 37(2):385-387, April 1956. 2 tables, 2 refs. DWB, DLC—An ecological study on the frequency of action of weather, with special reference to rainfall amount during a particular period. It was found that "the number of rats in various blocks declined drastically in the summer of 1953 and returned to their former level by Nov. This change coincided with a drought in July and a heavy rain in Aug." It is concluded on the basis of the frequency of such weather conditions over a period of 130 yrs that "summer weather is sufficiently severe to reduce rat generations about 2-5 times in 100 yrs." *Subject Headings: 1. Weather effects on rats 2. Rain-fall effects.—I.L.D.*

9.8-92

551.501.6:551.586:728

Olgay, Victor G., *Making of bioclimatical charts and their use in designing structures for livability*. (In: Mid-Southwest Conference on Tropical Housing and Building, Austin, Texas, April 1952, *Proceedings*. Austin, 1952? p. 49.) DWB (M629p)—The bioclimatic charts constructed at M.I.T. are valid only for moderate climatic zones and for mean sea level conditions in the U. S. Radiation, shading, air temp., humidity and wind are utilized. Comments are made on the relation of house shape and windows to climatic comfort. *Subject Headings: 1. Bioclimatic charts 2. Architectural meteorology.—I.L.D.*

9.8-93

551.586:612.014.4(26)

*Malhotra, M. S. (*Defence Sci. Org., New Delhi*), *Environmental comfort zone in warm and humid atmosphere*. *Journal of Scientific and Industrial Research, Sec. A*, New Delhi, 14(10):469-473, Oct. 1955. 5 tables, 7 refs. DWB, DLC—The comfort zone was determined for sedentary workers on a ship traveling during July-Aug. through waters with different weather during which the atmospheric temperature ranged from 60°-93°F dry-bulb. Seven thermal scales were derived for recording the opinions of the subjects and comfort zones in summer were determined for individuals' different types of dress. Data are presented on comfort zone for persons wearing tropical dress in summer and in cooler climate and comfort zones for persons with woolen dress in winter. *Subject Headings: 1. Comfort zones 2. Marine bioclimatology.—I.L.D.*

9.8-94

551.506.1(794) 551.582.2(794)

*Sissenwine, Norman; Anstey, Robert and Meigs, Peveril, *Studies on clothing for hot environments, Death Valley, 1950*, Pt. 2, **Environment**. U. S. Quartermaster Corps. Research and Development Branch. Environmental Protection Section, Report, No. 178, June 1951. 58 p. 27 figs. (incl. photos), 11 tables, 18 refs. **DWB**—In connection with Quartermaster Corps studies on clothing suitable for hot environment carried out during the summer of 1950, a detailed report was prepared on the physical geography of Death Valley, Calif. In addition to a description of the topography, geomorphology of various geographic features such as salt flats, sand dunes, stream action, flash floods, etc., the report contains an analytic description of the meteorological conditions. The methods and apparatus for measuring air temperature, ground surface temperature, ground temperature, effective air temperature, blackbody temperature of surroundings, humidity, wind speed and direction, radiation and cloudiness are described. Data are presented in both tabular and graphical form as the diurnal variation of air temperature, both horizontally and vertically, effective sky temperature, surface temperature, humidity (dew point and relative humidity), radiation and cloudiness. The climate representative of Death Valley in respect to the principal meteorological variables is examined. The appendix contains the paradiometer equations and the complete record of the meteorological data obtained during the summer of 1950. *Subject Headings*: 1. **Observational data** 2. **Climate of Death Valley, Calif.** 3. **Temperature measurement** 4. **Clothing climates** 5. **Death Valley, Calif.**—*I.L.D.*

9.8-95

616.3:525.5

Mangelsdorff, Bernhard, *Magentonus und Ulkuskkrankheit unter dem Einfluss der Jahreszeiten*. [Stomach tonus and ulcers under the influence of the seasons.] *Annalen der Meteorologie, Medizin-meteorologische Hefte*, No. 9:77-80, 1953. fig., 3 tables, refs. **DWB**, **DLC**—Clinical study of 1010 patients at Hamburg showed peaks of hypertony in spring and autumn. Ulcers show same seasonal distribution, indicating a connection. Meteorological factors not known. *Subject Headings*: 1. **Stomach diseases** 2. **Seasons.**—*C.E.P.B.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Hydrometeor obs.** (Pushkarev), 9.8-3; **Caribbean sferics network**, 9.8-10; **Observer's manual**, 9.8-11; **Arctic weather stations** (Sykes), 9.8-34; **Radar storm detection** (White), 9.8-62; **Bioclimatic charts and architectural met.** (Olgyay), 9.8-92; **Pilot balloon tracking** (Reshetov), 9.8-111; **Numerical forecasting and balance equation** (Shuman), 9.8-129; **Atmos. radiation research** (Möller, Friedrich), 9.8-179; **Raindrop velocity** (Sinha), 9.8-221; **Water balance of swamps** (Romanov), 9.8-235; **Sferics waveforms** (Kimpura), 9.8-277; **Thunderstorm elec.** (Brook), 9.8-279; special bibliography on **Radar Meteorology**, p. 1005.

9.8-96

551.501:551.521.12(94)

Sapsford, C. M. (*N. S. W. Univ. of Technology*), *An estimation of solar energy radiation for Australia*. *Australian Journal of Science*, Sydney, 20(4):99-105, Nov. 1957. 10 figs., 12 refs., 7 eqs. **DLC**—The fundamental importance of obtaining accurate solar radiation records for a number of stations on the Australian continent is stressed while an approximate method of estimating average daily solar radiation (sun and sky) is outlined, the calculations being based upon published figures. The limitations of this method are stressed and a recommendation is made for interested organizations and government bodies to collaborate in providing facilities for an extensive network of solar radiation recording stations. A start has been made in this direction by the Met. Dept. of Melbourne Univ. and the New South Wales Univ. of Tech. It is, however, noted that some calculation would always be necessary to fill in the solar radiation values between points where records were available. *Subject Headings*: 1. **Solar radiation networks** 2. **Solar energy estimation** 3. **Australia.**—*Author's abstract.*

9.8-97

551.501.4:551.571

Cădăz, M., *Einige Anwendungen der Clausius-Clapeyronschen Gleichung in der Meteorologie*. [A use for the Clausius-Clapeyron equation in meteorology.] *Beiträge zur Physik der Atmosphäre*, Frankfurt a. M., 29(4):235-241, 1957. 3 tables, 5 refs., 35 eqs. German, English and French summaries p. 235. DWB, DLC—It is shown by several examples that different meteorological problems can be solved with the use of the Clausius-Clapeyron equation. The relation between dew point temperature and relative humidity, and the relation between condensation level and relative humidity at the ground, are given. The equation for the rate of condensation in a cloud is derived, and so on. *Subject Headings*: 1. Clausius-Clapeyron equation 2. Dew point-relative humidity relationships 3. Condensation level-relative humidity relationships.—*Author's abstract*.

9.8-98

551.501.4:551.55

*Potter, J. G., *The elimination of directional bias in wind data*. *Canada. Meteorological Div., CIR 2803, TEC-235*, July 24, 1956. 5 p. 2 figs., table, ref., eqs. DWB, DLC—RATNER's (see 3.10-31, Oct. 1952, MAB) method of adjusting 16 point wind direction data for bias in favor of the prime (8) directions is used to smooth direction data for 6 Canadian stations (shown graphically). Method of computation is shown for Regina in a table. This method will admittedly smooth out actual extreme values. *Subject Headings*: 1. Wind direction bias 2. Wind roses 3. Regina, Sask. I. Ratner, Benjamin.—M.R.

9.8-99

551.501.42

Sneyers, R. (*Inst. Roy. Mét., Belgium*), *Sur la détermination de l'homogénéité des séries climatologiques*. [Determination of the homogeneity of climatological series.] *Journal Scientifique de la Météorologie*, Paris, 8(28):359-372, Oct./Dec. 1955. 7 figs., 14 refs., eqs. French, English and Spanish summaries p. 359. DWB. Also reprinted as *Belgium. Institut Royal Météorologique, Contributions*, No. 54, 1957 (paging of original.) DWB—Application of an extension of V. CONRAD's method of homogenizing climatic series to (a) Wind data for Uccle (1901-1930) and (1933-54), (b) Rainfall data for Uccle and Brabant (1928-1954), (c) Air temperature data for Uccle (1910-1953), d) Sunshine at Uccle (1900-1954), to determine whether these series are homogeneous and to correct for inhomogeneity. Extensive text and graphical presentations make the paper easily comprehensible. Various other statistical tests are applied. *Subject Headings*: 1. Homogeneity 2. Time series testing 3. Uccle, Belgium. I. Conrad, V.—M.R.

9.8-100

551.501.6:551.582(671)

Pouquet, J., *Le plateau du Labé, Guinée Française A.O.F.: remarques sur le caractère dramatique des phénomènes d'érosion des sols et sur les remèdes proposés*. [The Plateau of Labé, French Guinea, French West Africa: remarks on the dramatic character of soil erosion phenomena and proposed measures.] *Institut Française d'Afrique Noire, Dakar, Bulletin, Ser. A*, 18(1), 1-16, Jan. 1956. 4 figs., 8 photos. DWB—Meteorological or climatic factors which might affect erosion (through maintenance of a heavy cover of vegetation in the wet season) are treated graphically on p. 6-8, and discussed. A climagram for Labé showing precipitation, wind, maximum and minimum temperature, thunderstorms, number of days with precipitation, etc., and another showing the diurnal and annual humidity (absolute) variations, the periods when the humidity every day is 100%, and 20%, respectively, are presented. Precipitation=1,750 mm (70 in.) a yr and varies from next to nothing in some months to 350 mm at the height of the rainy season (July and Aug.). The dry season is cool and pleasant with occasional frost. Labé is at an elevation of 1050 m. *Subject Headings*: 1. Climate and erosion 2. Climagrams 3. Climate of Labé, French Guinea 4. Labé, French Guinea.—M.R.

9.8-101

551.501.7:551.508.822

Payne, Robert (*Cook Res. Labs.*), *A radiosonde data processing computer*. *The Cook Technical Review*, Chicago, 4(2):1-25, Oct. 1957. 26 figs., 6 refs., eqs. DWB—The incremental record strip is a physical observation data from which may be manually evaluated while still being amenable to automatic data processing techniques. To convert to incremental

record from present radiosonde observational data, a radiosonde digital data processing computer has been built. A tabular data converter has been incorporated in the computer to perform parameter conversion of significant level temperatures and pressures. Comparison circuitry extracts the temperature and pressure difference between significant levels for a linear interpolation process. The linear interpolator distributes equal temperature difference sub-intervals within the pressure difference interval by an iterative interpolation. Logic circuitry converts the interpolator output to incremental printer print mark signals. The techniques used in the radiosonde data processing computer will furnish a base from which other physical observational data conversion processes may be derived. *Subject Headings: 1. Radiosonde data processing 2. Automatic computers.—Author's abstract.*

9.8-102

551.501.8:551.510.61

Hille, Alfréd, *A radar alkalmazásáról a meteorológiában.* [Radar meteorology.] *Természeti és Technika*, Budapest, 111(6):374-375, June 1952. **DLC**—Basic principles of storm and precipitation detection by radar are explained. In connection with the variability of the effective range of radar, the author stresses the necessity of investigating the effect of atmospheric conditions in the lowest 200 m on radar wave propagation. In the Soviet Union, radar is used for tracking sounding balloons when visibility is obstructed. *Subject Heading: 1. Radar meteorology.—G.T.*

9.8-103

551.501.81:551.577

*Hiser, Homer W.; Conover, L. F. and Senn, H. V., *Investigation of rainfall measurement by radar, Aug. 1, 1956 to June 30, 1957.* Miami, Univ. of (Coral Gables). Marine Laboratory (and) Radar Research Lab., Contract Cwb-9012, Final Report, June 1957. 62 pp. 19 figs., 8 tables, 9 refs. **DWB** (M77.2 M618in)—Equipment (SP-1M and MPS-4 radars; radarscope repeaters, cameras, densitometers) is described and illustrated. Techniques (continuous exposure method and multiple exposure method) are also described; radar-rainfall correlations by point and areal method (for storms of Jan. 21, Feb. 26 and Feb. 27, 1957) analyzed and illustrated; and special storm studies of various types presented (Jan. 21 and Feb. 19, 1957). *Subject Headings: 1. Radar rainfall measurement 2. Radar storm rainfall studies.—M.R.*

9.8-104

551.501.81:551.594.221

Pawsey, J. L. (C.S.I.R.O., Radiophysics Div., Sydney, Australia), *Radar observations on lightning of 1.5 meters.* *Journal of Atmospheric and Terrestrial Physics*, London, 11(3/4):289-290, 1957. 3 refs. **DLC**—Very early observations on 1.5 m of echoes from lightning flashes are described. Approximate values for the echo cross-section, ($\approx 40 \text{ m}^2$), duration ($\approx \frac{1}{4}$ sec) and horizontal extent (several miles) are given. The associated atmospheric properties are also described. *Subject Heading: 1. Radar echoes from lightning.—Author's abstract.*

9.8-105

551.501.81:551.511

Schuetz, John (*Illinois State Water Survey*), *The relationship between maximum echo top and stability.* *Weather Radar Conference, 6th, Cambridge, Mass., March, 1957, Proceedings*, pub. 1957. p. 215-220. fig., table, 5 refs. **DWB** (M01.81 R124pc)—SHOWALTER's Stability Index, a positive area index, and two indices based on the change of potential temperature with height were tested to find the correlation between maximum echo top as determined by a TPS-10, 3-cm radar and these stability indices. The index utilizing the difference between mean equivalent potential temperature for the lowest 100 millibars and 500 millibars, and SHOWALTER's Stability Index showed the highest correlation. Six out of seven cases which deviated greatly from two or more regression lines could be explained by either advection, changing the stability conditions, or the presence of a shallow cold layer of air which exaggerated the stability. *Subject Headings: 1. Stability indices 2. Showalter's Stability Index 3. Radar stability determination.—Author's abstract.*

9.8-106

551.501.81:551.577

Semonin, Richard G. (*Illinois State Water Survey*), *Radar-indicated rainfall estimates corrected for precipitation attenuation.* *Weather Radar Conference, 6th, Cambridge, Mass.,*

March 1957, Proceedings, pub. 1957. p. 237-242. 4 figs., 5 refs., 4 eqs. DWB (M01.81 R124pc)—Precipitation attenuation influences quantitative measurement of precipitation with 3-cm radar. Radar-indicated rainfall data were obtained from the AN/APS-15 and AN/CPS-9 radar sets during 1952-55. The ROBERTSON and KING empirical relationship was used to adjust radar-indicated rainfall amounts. The radar-indicated amounts, both corrected and uncorrected, were compared with raingage values obtained from a dense raingage network of 50 gages in 100 sq mi. Results indicate that attenuation compensation using the ROBERTSON and KING relationship does not eliminate the graphical scatter usually found in radar-indicated precipitation estimates. *Subject Heading: 1. Radar precipitation measurement.*—*Author's abstract.*

9.8-107

551.501.81:551.515.2

Senn, H. V. and Hiser, H. W. (both, *Marine Lab., Univ. of Miami*), **Tracking hurricanes with radar.** *Weather Radar Conference, 6th, Cambridge, Mass., March, 1957, Proceedings*, pub. 1957. p. 165-170. 3 figs., 8 refs., 3 eqs. DWB (M01.81 R124pc)—Previous tracking methods and some of the discrepancies between the various center positions which they describe are discussed. A new method is developed for finding the storm center by means of logarithmic spiral overlays which accurately described the spiral precipitation bands as observed on radar and their relation to the storm center. Narrow, well defined squall lines, with echoes that are more intense than the spiral bands which they precede, have been observed in several storms at distances up to 400 mi ahead of the storm center. These "pre-hurricane squall lines," which are noticeably different from spiral bands in appearance and movement, may offer clues to the future path of the storm. *Subject Heading: 1. Radar hurricane tracking.*—*Authors' abstract.*

9.8-108

551.501.83

Rivault, R. (*Faculté des Sci., Poitiers*), **Caractéristiques des sifflements observés au cours d'une année.** [Characteristics of whistlers observed in the course of one year.] *L'Onde Electrique*, Paris, 37(362):539-540, May 1957. fig. DLC—Frequency and wave-form characteristics of whistlers were recorded at Poitiers, France. Two types were identified: those of short duration (connected with thunderstorm activity in the Southern Hemisphere) and those of longer duration (preceded by an atmospheric of a particular type associated with lightning in the Northern Hemisphere). Wave forms of long whistlers would indicate that they are closely connected with the mechanism of formation of the sferics which precede them. *Subject Headings: 1. Whistling atmospherics 2. Sferics wave forms 3. Poitiers, France.*—*G.T.*

OBSERVATIONAL DATA

See also: Rye-climate relationships (Nuttonson), 9.8-17; *Barley-climate relationships* (Nuttonson), 9.8-19; *Met. data, Antarctic Ocean*, 9.8-37; *IGY Antarctic program* (Popov), 9.8-38; *Historic weather records* (Manley), 9.8-43; *IGY satellite program* (Singer), 9.8-57; *Pilot reports and weather* (U. S. W. B.), 9.8-58; *Temp. meas., Death Valley, Calif.* (Sissenwine et al.), 9.8-94; *Effective radiation, Belgium Congo* (DeCoster, Schüepp), 9.8-182.

9.8-109

551.506.3(68/688) 551.577.37(68/688)

*South Africa. Weather Bureau, **Klimaat van Suid-Afrika, deel 3, Maksimale 24-uur Reënval.** [Climate of South Africa, Pt. 3, maximum 24-hour rainfall.] Its WB 21, 1956. 5 p. 2 tables, 6 maps. In English and Afrikaans. DWB (M82.2/68 S726k)—A revision and expansion of the 1942 paper by T. E. W. SCHUMANN 'n Studie oor die Maksimale Daglikse Reënval in Suid-Afrika, and a supplement to the 2 reports on the climate of S. Africa (temperature and rainfall) issued in 1954 and 1955. The charts (col.) and tables give maximum 5, 10, 20, 30, 60 and 100 year, 24-hour rainfall expectancies for 253 stations in South and South-west Africa. In addition, the tables give coordinates of stations, length of record, average annual rainfall, values for 15, 40 and 80 year return period (as well as the return periods charted), and the highest observed daily amount in the entire period of record (50 stations

have 7-83 years). At 45% of the stations, the actual maximum is significantly higher than the expected, partly due to occasional accumulations of more than 1 day of rainfall between readings at voluntary observer's stations. The last two columns give the mean of the annual 24-hr maxima and the standard deviation of observed maximum values. (For abstracts on Pts. 1-2, see 7.4-96 and 7.4-97, April 1956, *MAB.*) *Subject Headings:* 1. Climate of South Africa 2. Maximum rainfall 3. Rainfall data 4. South Africa.—*M.R.*

INSTRUMENT CARRIERS

See also: Balloon ranging device and transponders (Mantis), 9.8-15; Earth satellite obs. (Odishaw), 9.8-25; Earth satellite obs. (Hagen), 9.8-26; Satellite tracking (Peterson et al.), 9.8-51; Artificial satellites (Raimond), 9.8-52; Satellite orbits (Roberson), 9.8-53; Satellite obs. (Singer), 9.8-55; Soviet satellite development (Singer et al.), 9.8-56; IGY satellite program (Singer), 9.8-57; Balloon-borne radiometers (Suomi et al.), 9.8-181; Rocket meas. of auroral radiation (Van Allen), 9.8-287.

9.8-110

551.507.321.2:551.521.64

Powell, C. F., **High altitude research.** *Science and Culture*, Calcutta, 21(6):313-314, Dec. 1955. **DLC**—Remarks on early experiences in cosmic ray research, especially those connected with making balloons of rubber (not successful), and with polyethylene which involved a laborious ironing process to seal up the edges of the gores. Later, a hot air machine was developed which sealed the joints much faster and allowed sections 75 ft long to be handled. The bigger balloons had fewer leaks than the small ones. The first big balloon (Sept. 1950) required 30 people to hold it down and rose to 65,000 ft and landed in a Dutch village. *Subject Headings:* 1. High altitude balloons 2. Cosmic ray research.—*M.R.*

9.8-111

551.507.321.2:551.501.810

Reshetov, V. D., **Ob izmerenii dal'nosti radiopilotov.** [Measurement of distance of radiopilots.] *Moscow. Tsentral'naiia Aerologicheskaiia Observatoriia, Trudy*, No. 16:52-58, 1956. 4 refs., 15 eqs. **DLC**—A theoretical paper discussing the magnitude and the cause of errors in the measurement of the distance of radiopilot balloons made with the aid of radar. It is shown that transitional processes of excitation in resonance systems of radiopilot balloons and, especially of receivers, can be the cause of essential errors in the determination of the distance in the sense of overestimation. *Subject Heading:* 1. Pilot balloon tracking by radar.—*A.M.P.*

9.8-112

551.507.352:551.508:551.515.2

Simpson, T. H. (*U. S. Weather Bureau*), **Aircraft instrumentation and recorders for hurricane investigation.** *Washington Academy of Sciences, Journal*, 47(1):27-28, Jan. 1957. Secretary's abstract. **DWB, DLC**—Damage, energy and other aspects of hurricanes are noted in the National Hurricane Research Project especially, its instrumental and observational aspects described, etc. *Subject Headings:* 1. Hurricane reconnaissance 2. Airplane instrumentation.—*M.R.*

9.8-113

551.507.362.1

Pressly, E. C. and Townsend, J. W., Jr. (*Rocket Sonde Branch. Atmosphere and Astrophysics*), **Upper atmosphere research, Report No. 26. Aerobee-Hi Report Number 3, The NRL-38 firing.** *U. S. Naval Research Laboratory, NRL Report*, 4757, June 6, 1956. 15 pp., 11 figs. (incl. photos), table, 4 foot-refs. **DWB (M11)**—Aerobee NRL-38, the second prototype Navy Aerobee-Hi rocket, was launched at the White Sands Proving Ground on Dec. 9, 1955. The flight was a complete failure due to a hard start which occurred in the sustainer engine at takeoff. The rocket exploded just as it left launching tower and fell into the firing area compound. As a result of this failure, which was the second in a row with the Navy Aerobee-Hi, the entire rocket system will be carefully evaluated before the next flight is scheduled in May 1956. *Subject Headings:* 1. Aerobee rockets 2. White Sands, N. M.—*Authors' abstract.*

INSTRUMENTS

See also: **Instrument manuals** (Dobson), 9.8-6; **Radar storm detection** (White), 9.8-62; **Radiosonde data processing** (Payne), 9.8-101; **Hurricane reconnaissance** (Simpson), 9.8-112; **Dew forecasting** (Davis), 9.8-141; **Robitzsch pyranograph** (Schöne), 9.8-183; **Nuclei effectiveness** (Sano, Fukita), 9.8-215; special bibliography on **Radar Meteorology**, p. 1005.

9.8-114

551.508.29:551.525.4

Franssila, Matti (*Finnish Met. Off., Helsinki*) and Huovila, Seppo (*Inst. of Met., Univ. of Helsinki*), **On the measurement of the heat flux into the soil.** *Geophysica*, Helsinki, 5(3):124-33, 1957. 2 figs., 4 tables, 3 refs. **DLC**—A simple instrument for measuring the heat flux into or out of the soil is described, together with a calibration apparatus. The instrument is similar to the heat flux plates used by FALCKENBERG and DEACON. The calibration apparatus is composed of a heat-insulating case having an electric oven on its bottom. An upward heat flux can be produced by the oven and its intensity can be computed with great accuracy. Several experiments were carried out, both in the laboratory and in the field, with a view to studying the accuracy of the method. The laboratory experiments revealed that errors of up to 50% may be caused by evaporation if a plate is placed close to the soil surface. The field experiments, however, were so encouraging that this method, together with the classical method, will be adopted at the aerological stations in Finland during the GY. **Subject Headings:** 1. Soil heat flux 2. Soil temperature measurement techniques 3. Soil temperature instruments.—*Authors' abstract.*

9.8-115

551.508.91

Gillings, D. W., **Automatic particle counting: some principles of instrument design.** *Instrument Practice*, 9(8,9):763-770; 886-889, Aug., Sept. 1955. 10 figs., 25 refs.—The paper deals mainly with design of instruments for counting and grouping into size ranges particles precipitated from clouds on to a single plane surface, e.g., colliery dust, by optical scanning and electronic counting. The thermal precipitation is described and a design put forward for scanning by a beam of light and photosensitive device. Two systems are described, the "comprehensive" in which information about each particle is automatically grouped, and the simpler "selective" system which merely counts particles, the sizing being done by repeated scanning, chord length or other means. **Subject Heading:** 1. Particle counters.—*C.E.P.B.*

9.8-116

551.508.91:551.574.1

Gunn, Ross and Phillips, B. B., **An experimental investigation of the effect of air pollution on the initiation of rain.** *Journal of Meteorology*, 14(3):272-280, June 1957. 7 figs., table, 10 refs., eq. **DWB**—Abundance of nuclei in a cloud chamber (vol. 3000 m³) in clean air near Gulf of Mexico profoundly influenced rain-initiating processes. Ordinary air on expansion produced a dense cloud of stable droplets of radius 7 μ or less. Air freed from pollution and condensation nuclei produced larger droplets which disappeared by precipitation. Procedure is described; median droplet radius was calculated from slides exposed at intervals. Droplet distributions under different conditions of cloud formation are plotted; median radius increased from 7.02 to 12.4 μ when electrostatic precipitation was operated for 32 hours and 5 μ after 64 hrs. Expansion rate of rapidly developing CuNb gave a mean droplet radius >150 μ . It is considered that a fundamental requirement for production of precipitation from natural clouds is cooled clean nearly saturated air immediately above, relatively free of condensation nuclei. **Subject Headings:** 1. Cloud chambers 2. Condensation nuclei.—*E.P.B.*

9.8-117

551.508.91

Mühleisen, Richard, **Neue Methoden der Kondensationskernzählung.** [New methods for counting condensation nuclei.] *Germany. Deutscher Wetterdienst, Berichte*, 4(22):143-144, 1956. fig., 4 refs. **DWB, DLC**—The author discusses methods for measuring the size and distribution of condensation nuclei, and their type and chemical composition, and then describes in detail with the aid of a diagram a condensation nuclei counter with continuous supersaturation. **Subject Heading:** 1. Nuclei counters.—*I.L.D.*

9.8-118

551.508.91

Orr, Clyde and Martin, Roy A. (both, Georgia Inst. of Technology, Atlanta), **Thermal precipitator for continuous aerosol sampling.** *Review of Scientific Instruments*, N. Y., 29(2):129-130, Feb. 1958. 2 figs. DWB, DLC—Thermal precipitation is attractive for air-borne particle collection because of the high collection efficiencies which may be attained and the convenient examination of the deposit. Most thermal precipitators, however, have very low sampling capacities or flow rates. To take fullest advantage of the desirable features of thermal precipitation, a new precipitator was designed and constructed. It operated continuously, and deposited particles upon a moving tape or substrate. Complete collection of particles resolvable with an electron microscope was attained in a 3-in. diameter precipitating zone at a flow rate of 11/min. *Subject Headings: 1. Thermal precipitators 2. Aerosol measurement.—Authors' abstract.*

9.8-119

551.508.91:622

Pritchard, F. W. (Cheltenham, Gloucestershire, Eng.), **A modified "thermal conductivity" gas analyser for measuring methane in air or carbon dioxide.** *Journal of Scientific Instruments*, London, 29(4):116-117, April 1952. 2 figs., 2 refs. MH-BH—Measurement of the convective instead of the conductive heat transfer from heated platinum wires enables one to separately the presence of methane by an instrument, which is practically insensitive to water vapor, oxygen, nitrogen and carbon dioxide. Applied for mining safety. *Subject Headings: 1. Mining safety 2. Gas analyzers.—A.A.*

9.8-120

551.508.91

†Silverman, Leslie and Billings, Charles E. (Harvard School of Public Health), **Methods of generating solid aerosols.** *Air Pollution Control Association, Wilmerding, Pa., Journal*, 6(2):76-83, Aug. 1956. 8 figs., 2 tables, numerous foot-refs. DLC—Redisperison and primary formation techniques for homogeneous or heterogeneous solid aerosol generation are reviewed and characteristics of 32 different generators used by various research institutes in the U. S. are tabulated. Advantages and shortcomings of each method are discussed. A list of materials used for production of solid aerosols, and illustrations of some of the generators are included. *Subject Headings: 1. Solid aerosols 2. Aerosol generators.—G.T.*

9.8-121

551.508.91

Stephen, R. C. (Tobacco Res. Board of Rhodesia and Nyasaland), **A simple spore trap.** *Nature*, London, 179(4574):1360-1361, June 29, 1957. ref. DWB—Describes a simple apparatus consisting of a convergent aluminium cone facing into the wind, leading to a divergent cone. A slotted holder mounts two slides in the center. Two wind vanes are mounted on rear cone. Slides were covered with a film of paraffin and rubber lubricant. The spore trap has been working satisfactorily for over a year. *Subject Heading: 1. Aerosol samplers.—C.E.P.B.*

9.8-122

551.508.91

Verzar, Fritz, **Automatischer Kondensationskernzähler.** [Automatic condensation nuclei counter.] *Germany. Deutscher Wetterdienst, Berichte*, No. 4(22):145, 1956. 6 refs. DWB, DLC—The automatic condensation nuclei counter consists of a metal tube. The light from a lamp shining through the tube is recorded by means of a selenium or vacuum photoelectric cell. A second photoelectric cell serves to establish the zero point. An electric pump sends air through the tube. A fog is produced in the tube, the density of which is measured by the decrease in the photoelectric cell circuit. A rapidly recording galvanometer or cathode ray oscillograph records the photoelectric cell circuit. The devices operate automatically. *Subject Heading: 1. Photoelectric nuclei counters.—I.L.D.*

9.8-123

551.508.91

Gavrilov, V. A., **O diafanoskopicheskom metode opredeleniia meteorologicheskoi dal'nosti vidimosti na gidrometeorologicheskikh stantsiakh.** [Diaphanoscopic method of determining meteorological visibility distance for hydrometeorological stations.] *Meteorologiya i Gidrologiya*, No. 9:45-48, Sept. 1956. DWB, DLC. English trans. DWB (M08.92 G283d)—The

presence of the diaphanoscope method for determining distance of meteorological visibility consists of looking at an ocular scale of an instrument with a series of gray marks of different contrast and finding a mark, the brightness of which corresponds to the greatest degree with the brightness of objects visible simultaneously at a weather station. The accuracy of this procedure, developed by V. V. SHARONOV, is discussed. This technique was modified by the author so that the observer has to choose not an equally contrasted object but rather the closest, perceptibly brighter object than the mark. The apparatus used by the author in his experiments is described and illustrated, the sources of errors and needed corrections are discussed and the results are presented in a table. Improved accuracy in measuring visibility by the modified technique is obtained. *Subject Headings: 1. Visibility measurement techniques*
Visibility instruments.—I.L.D.

9.8-124

551.508.94:551.594.1/2

Fitzgerald, Donald R., *Measurement systems for atmospheric electricity observations*. Chicago. Univ. Dept. of Meteorology, Contract AF 33(038)-25913 and Contract AF 19(604)-18, Cloud Physics Research, Technical Note, No. 1, May 1, 1955. 49 p. 33 figs. (incl. photos), 6 tables, 23 refs., 28 eqs. DWB—Measurement systems developed from Feb. 1952 to Aug. 1954 by members of the Cloud Physics Project staff to study electrostatic properties of Cu clouds and their relation to precip. formation are described in detail. Ground measurements were made at Univ. of Illinois airport 5 mi S. of Champaign, and flight measurements in the Midwest and Caribbean. The electric field meter network yielded 4000 hrs of data in 1952. Network and equipment are described. Remote installation field meters, fast response field meter, conductivity and small ion equipment and aircraft field meter system are described in separate chapters and illustrated. *Subject Headings: 1. Cloud physics research 2. Atmospheric electricity measuring systems 3. Electric field meter networks 4. Aircraft field meter systems 5. Champaign, Ill.—M.R.*

9.8-125

551.508.94:551.594.11

Saxer, Leonhard and Sigrist, Werner, *Ein selbstkompensierender Elektrometerröhrenverstärker zur Registrierung des luftelektrischen Potentialgefälles*. [A self-compensating electrometer tube intensifier for recording atmospheric electric potential gradient.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 10(1):96-100, 1957. 2 figs. German, English and French summaries p. 96. DWB—A self-compensating electrometer-tube amplifier for recording the electric field of the atmosphere is described. The instrument has a high input resistance of 10^{14} ohms constant over the whole range and a linear indication covering any range desired, as, e.g., from -200 to +300 volts. *Subject Heading: 1. Potential gradient meters.—Authors' abstract.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: Aeromet. textbooks (Georgii), 9.8-5; Upper air atlases, Northern Hemisphere, 9.8-9; Drought and artificial rainfall, Mexico (Noble, Lebrija), 9.8-16; Flight planning and forecasts (Burkett, Gringorten), 9.8-59; Windbreaks and frost protection (Daigo, Maruyama), 9.8-79; Bridge construction, Ob River, U.S.S.R. (Eremina), 9.8-88; Hot summers (Suda), 9.8-168; Tropical cyclone movement, Australia (Phillips), 9.8-171; Visibility in haze and smoke, Tokyo (Yamada), 9.8-267.

9.8-126

551.509(728.4)

Portig, Wilfried, *Wettervorhersage-Regeln für El Salvador*. [Forecasting rules for El Salvador.] *Meteorologische Rundschau*, 10(3):107-108, May/June, 1957. DWB—A number of rules are laid down, especially for the rainy season. They deal with land and sea breezes and northers, the transition between dry and rainy seasons, and forecasting cold fronts, easterly waves and thunderstorms in the rainy season. *Subject Headings: 9. Forecasting rules 2. El Salvador.—C.E.P.B.*

9.8-127

551.509.312

Bedient, H. A. and Cressman, G. P. (both, Air Weather Service Joint Numerical Wea. Pred. Unit, Suitland, Md.), *An experiment in automatic data processing*. *Monthly Weather Review*,

Wash., D. C., 85(10):333-340, Oct. 1957. 3 figs., 2 tables, 9 refs. DWB, DLC—An experiment in the automatic preparation of input data for use in numerical prediction is described. The process includes the automatic recognition, identification, and decoding of the raw teletypewriter data up to the point where they are ready for use in objective analysis. The problems encountered and the methods used to attack these are described. Present methods of coding and communication are such as to impede progress in automatic processing of meteorological data. Suggestions are made for improved coding methods as well as for improvement in the methods of automatic processing used to date. *Subject Headings: 1. Numerical forecasting techniques 2. Automatic data processing.—Author's abstract.*

9.8-128

551.509.311

Petterssen, Sverre; Estoque, M. A. and Hughes, Lawrence A., **An experiment in prognostication.** *Journal of Meteorology*, 14(3):191-205, June 1957. 13 figs., 5 tables, 9 refs. DWB—For 11 Jan.-21 Feb. 1956 (except week-ends) barotropic forecasts for 500 mb and baroclinic forecasts for 1000-500 mb layer were graphically subtracted to give 1000 mb prognoses which were verified according to a scheme proposed by PETTERSEN in 1956. Graphical and adjusted prognoses and verifications are given for each day. The sea level prognoses were good in the east but not in the west (Rocky Mountain area). Adjusted prognoses averaged slightly better than National Analysis Center forecasts. This also applied to 500 mb prognoses but with some uncertainties. (For abstract on this paper from another source, see 8.4-13-4 April 1957, MAB.) *Subject Heading: 1. Numerical forecasting techniques.—C.E.P.B.*

9.8-129

551.509.312:551.501.4

Shuman, Frederick G. (U. S. W. B. Joint Numerical Wea. Pred. Unit, Suitland, Md.). **Numerical methods in weather prediction, Pt. 1, The balance equation.** *Monthly Weather Review*, Wash., D. C., 85(10):329-332, Oct. 1957. 7 refs., 11 eqs. Also: Pt. 2, **Smoothing and filtering.** *Ibid.*, 85(11):357-361, Nov. 1957. 6 figs., 2 refs., 9 eqs. DWB, DLC—Two methods of solving the balance equation are outlined in the first paper. Both methods have been used successfully on a daily operational basis at the Joint Numerical Weather Prediction Unit for a period of more than a year. Solutions were on the operational grid of 30×34 points spaced at 381-km intervals. In the second paper, a method is developed for the design of finite-difference smoothing and filtering operators which meet predetermined specifications and which are applicable to automatic computing machinery. The general technique is to build complicated operators from the simplest types. The necessity for smoothing predicted fields of stream functions before inverting the balance equation for heights of isobaric surfaces is brought out. *Subject Headings: 1. Numerical forecasting 2. Balance equations 3. Smoothing and filtering.—Author's abstract.*

9.8-130

551.509.311

Kashin, K. I. and Belousov, S. L., **Predvychislenie pogody.** [Numerical forecasting of weather.] *Nauka i Zhizn'*, Moscow, No. 5:40-42, May 1956. illus. DLC—A popular scientific account of the present situation and future potentialities of physico-mathematical forecasting "first successfully carried out by I. A. KIBEL in 1940" and developed since then in the U.S.S.R., the U. S. and other countries. The synoptic charts which may be prepared by these methods, for short range and ultimately for long range forecasting, are described and illustrated. The purpose of these machine methods is to increase the speed and accuracy of preparation of forecasts, but it is assumed that weather processes follow precise physical laws. *Subject Headings: 1. Numerical forecasting 2. U.S.S.R. I. Kibel, I. A.—M.R.*

9.8-131

551.509.311

Maine, R. (Div. Office, Adelaide), **An application of one dimensional numerical forecasting in the Australian region.** *Australian Meteorological Magazine*, Melbourne, No. 17:18-30, June 1957. 4 figs., 6 tables, 3 refs., 11 eqs. DWB—A five-degree grid interval for numerical integration was used in the solution of the one dimensional differential equation of motion to the equivalent barotropic model (after CHARNEY, 1949) using data in the Australian region. The forecasts along adjacent latitudes were then juxtaposed (after GATES, 1953) and a "two dimensional" forecast obtained. The "two dimensional" forecast requires considerable time

for preparation and is thus uneconomical by our present standards. However, it is suggested that a one dimensional forecast along a selected latitude (say 40°S) when incorporated with the usual subjective prognostic may be used to practical advantage. *Subject Headings: 1. Numerical forecasting 2. One dimensional forecasting 3. Australia.—Author's abstract.*

9.8-132

551.509.314

White, Robert M. and Galligan, Agnes M. (both, A. F. Cambridge Res. Center, Cambridge, Mass.), **Comparative accuracy of certain statistical and synoptic forecasting techniques.** *American Meteorological Society, Bulletin*, 37(1):1-7, Jan. 1956. fig., 5 tables, 4 refs., 3 eqs. **DWB, DLC**—"A series of 125 daily forecasts of the pressure-height distribution at 1000, 500 and 200 mb at eight stations in the eastern U. S. were prepared by means of a statistical technique employing empirical influence functions. The accuracy of such forecasts was found to be comparable with that attained by synoptic techniques." *Subject Headings: 1. Numerical forecasting 2. Synoptic forecasting 3. Empirical influence functions.—Based on authors' abstract.*

9.8-133

551.509.318:551.553.21 (522)

Ueki, K., **Forecasting of monsoon outbreak over the Far East by 500 mb weather typing.** *Journal of Meteorological Research*, Tokyo, 9(8):583-595, Aug. 1957. 11+ figs., 3 tables. **DWB**—The author examined a method of forecasting the monsoon outbreak over the Far East by 500 mb weather typing. Principal terms are as follows: (1) Outbreaks of monsoon over Kyushu and its neighborhood are classified into two types, that is: (i) cold type gust associated with the polar jet stream, (ii) warm type gust associated with the subtropical jet stream. (2) In case of cold air outbreak, 500 mb contour pattern may be divided into five types, that is, type -1_c , -2_c , -3_c , -4_c and -5_c . (3) Large scale stream pattern may be divided into two types -1_s and -2_s by use of continuity chart. (4) Examples of each weather type are shown in figure. *Subject Headings: 1. Monsoon date forecasting 2. Far East.—Author's abstract.*

9.8-134

551.509.33:551.577:551.509.542

Courvoisier, H. W., **Grosswetterverhältnisse, Entstehung und Vorauserkennung mehrtagiger Niederschlagsperioden im Westalpengebiet.** [Broad weather conditions, origin and prediction of rainfall periods of several days in the West Alpine region.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 10(1):43-65, 1957. 2 figs., 3 tables, 8 refs. German, English and French summaries p. 43-44. **DWB**—A type of several days' rain, corresponding synoptically to a developed cyclonic broad-weather situation, is termed a "rainfall period." These mostly extend over a large part of southern Europe. The relations between such periods in the western Alps, the broad-weather type and the upper currents, are investigated for 1949-51. With N.W. cyclonic situations and upper currents from N., rainy periods hardly ever occur because of lee effects, but a low over Britain and a trough over W. Europe bring appreciable rainfall. Rainfall periods over the Alps can be traced back to a combination of definite synoptic factors and can be forecast. *Subject Headings: 1. Precipitation forecasting 2. Synoptic studies 3. Alps.—C.E.P.B.*

9.8-135

551.509.5:551.509.25

Pettersen, Sverre, **On verification of prognostic charts.** Chicago Univ. Dept. of Met., Contract AF 19(604)-1293, Scientific Report No. 9, March 1956. 14 p. 3 tables, 5 refs., eqs. **DWB, DLC**—The practice of verifying prognostic charts by computing the correlation between the observed and predicted pressure changes is questioned, in that it emphasizes the importance of out-of-phase trough or ridge situations, and minimizes in-phase situations by lumping them with "persistence" types. It is demonstrated that even forecasting a persistent type takes some skill, and that the user wants to know what the actual circulation will be, not the residual changes in circulation. Therefore it is more useful to verify by using the correlation between predicted and observed pressures, and the root mean square error. For particular application, other methods might be warranted. Examples (30-34 hr sea level charts during Jan. and Feb. 1956) are tabulated and discussed. *Subject Headings: 1. Forecast verification 2. Prognostic chart accuracy.—M.R.*

9.8-136

551.509.51:551.575.2

Dranevich, E. P., *Opyt prognoza razvitiia advektivnykh tumanov nad Leningradskoi oblast'iu*. [Forecasting the development of advective fog in Leningrad Oblast.] *Meteorologiya i Gidrologiya* No. 8:26-28, Aug. 1956. 2 figs., table, 3 refs. English trans. avail. DWB (M09.325 D764ex), DLC—The results of an analysis of three years of observations made in the Leningrad Oblast on the development of advective fogs during the winter in relation to the distribution of air temperature and relative humidity and their horizontal transport in the lower layer of the atmosphere, namely, 1.2 to 2.0 km. The advective fogs were classified in relation to the direction of motion of four principal air masses, viz: northwest, west, southwest and south. The relationship between advective fogs and air masses and the behavior of the relative humidity change, advective relative humidity, and temperature regime are discussed with the aid of graphs and a table. *Subject Headings*: 1. Advection fog forecasting 2. Advection fog 3. Leningrad Oblast, U.S.S.R.—I.L.D.

9.8-137

551.509.51:551.575.2

Majumdar, K. C. (*Regional Met. Center, Calcutta*), *Some studies on fog prediction at Dum Dum*. *Indian Journal of Meteorology and Geophysics*, Delhi, 8(3):309-312, July 1957. 2 figs., 3 tables, 3 refs., 2 eqs. DWB, DLC—Data for Feb. 1952-55 from local surface and radiosonde records and from monthly reports and daily weather maps have been used to prepare an objective forecast aid for fog occurrence at Dum Dum. Statistical analysis of dew point depressions for 1800Z at Dum Dum shows a seasonal variation in dew point depression for fog days and for all days, and that the mean depression for fog days is less than that for all days. A regression equation is given, with lowest value of visibility (V) between midnight and 9 A.M. local time as the dependent variable and dew point depression and depth of inversion layer as independent variables for use in multiple regression calculations. Curves are then worked out for the 3 variables, which when combined with synoptic information result in improved prediction. A scatter diagram with fog cases isolated is also presented. *Subject Headings*: 1. Fog forecasting diagrams 2. Objective fog forecasting 3. Dum Dum Airport, India.—M.R.

9.8-138

551.509.52:551.515.23:525.6

*Mackey, G. W. and Whittingham, H. E. (*both, Bureau of Met., Australia*), *Sea and swell in tropical cyclones*. (In: Tropical Cyclone Symposium, Brisbane, Dec. 1956, *Proceedings*, Pub. Dec. 1956. p. 413-430. 2 figs., 15 refs.) DWB—The history of the use of sea conditions as a forecasting aid in tropical cyclones is reviewed, and in the light of earlier views in other parts of the world, the 1955-56 cyclone season in the Australian region is investigated. It is shown that generally the same conclusions might be drawn in regard to the Australian occurrences as are held in any other area subject to tropical cyclones. More particularly, ocean swell is a useful forecasting aid over the eastern Indian Ocean, while evidence does not support this view in regard to northeastern Australian and Queensland coastal waters. Storm waves and storm tides have been observed on the Western Australian coast, and it is suggested that the latter could have forecasting value in that area. *Subject Headings*: 1. Tropical cyclone forecasting 2. Ocean swell 3. Storm tides 4. Western Australian Coast.—Authors' abstract

9.8-139

551.509.52

Simpson, C. L. and Thorp, J. M. (*both, General Elec. Co., Richland, Wash.*), *An objective method for forecasting winds at an inter-mountain station*. *American Meteorological Society Bulletin*, 38(8):470-474, Oct. 1957. 3 figs., ref., eqs. DWB—An empirical method for forecasting surface winds at an inter-mountain station, based on the differences in sea level pressure between Hanford and five other stations, is developed. Nomograms relating the ten-hour velocity trend to the pressure gradient are presented. The method is discussed in relation to conventional methods of wind forecasting as pertaining to apparent counter gradient winds, cyclic features of the surface winds, and variations in wind speed. *Subject Headings*: 1. Wind forecasting 2. Objective forecasting.—Authors' abstract.

9.8-140

551.509.52:551.515.2

Whiting, R. M. and Bailey, R. E. (*both, Eastern Airlines Inc., Atlanta*), *Some meteorological relationships in the prediction of tornadoes*. *Monthly Weather Review*, Wash., D. C.

(S):141-150, May 1957. 18 figs., 5 tables, 8 refs. DWB—An objective forecasting study surface and upper level synoptic conditions in relation to tornado occurrence using Jan.-June data for the southern Midwest and Plains for 1950 through 1954 as dependent data, and 1955 for independent data. Polar charts show that in Jan., Feb. and March most tornadoes occur in a 450 mi radius of the center of a cyclone and in the S.E. quadrant. In April, May and June they occur more often in the N.E. quadrant. Their relationships with pressure, surface dew point, stability 850 and 700 mb patterns, 500 and 200 mb conditions, etc. are given. A list of 8 criteria is established and tests made on Jan.-June 1955 maps to see how well these criteria outline the tornado areas. Most cases of multiple tornadoes were correctly placed—number of isolated tornadoes were missed and on a few of the days forecast none occurred. *Subject Headings: 1. Objective tornado forecasting 2. Tornado forecasting 3. Great Plains. M.R.*

9.8-141

551.509.58:551.574.41:551.508.74

Davis, Paul A., **An investigation of a method for predicting dew duration.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 10(1):66-93, 1957. 11 figs., 6 tables, 10 refs., 3 eqs. English, German and French summaries p. 66-67. DWB—Parameters most closely related to dew formation, low level wind speed, dew point depression for surface layer and nocturnal means of net radiation, were plotted for favorable and unfavorable dew conditions. Radiation was found by BRUNT's formula corrected for cloud. Two years' data for Iowa State College, mainly on Duvdevani blocks, were analyzed to forecast dew duration over grass by plotting 4 types on nomograms. During June through Sept. 1954 observations were made with Duvdevani blocks at 18 Air Weather Service stations and compared with climatic data. Forecasting dew duration could be improved in various ways but could be successfully adapted at most stations. *Subject Heading: 1. Dew forecasting.—C.E.P.B.*

9.8-142

551.509.58:551.576.1

James, D. G., **Forecasting cirrus cloud over the British Isles.** *Great Britain. Meteorological Office, Professional Notes*, 8(123), 1957. 10 p. 3 figs., 5 tables, 6 refs. DWB—Some synoptic features are presented which are known to be associated with 4 oktas or more cirrus cloud over the British Isles. A combination of thirteen of these features is suggested for use in forecasting the occurrence of cirrus cloud up to 9 hr ahead, the features being evaluated on the current synoptic charts. For forecasts of up to 24-36 hr ahead, a combination of six of the features is suggested, the evaluations in this case being made from forecast charts. *Subject Headings: 1. Cirrus forecasting 2. British Isles.—Author's abstract.*

9.8-143

551.509.58:551.576.1:629.135.2

Osterle, Fletcher, **Condensation trail prediction.** Carnegie Institute of Technology. Dept. of Mechanical Engineering. Contract AF-18(600)-969, Scientific Report No. 3, Oct. 1956. 25 p. 8 figs., 2 tables, 11 refs., 23 eqs. "This Scientific Report constitutes Pt. 1 of the Final Report to be published in 3 parts." DWB—Criteria and nomograms for predicting condensation trails from the exhaust of jet airplanes are developed and presented. The Air Weather Service criteria are said to be slightly in error, as they do not allow for the fact that contrails will not be visible unless air is sufficiently above saturation, and, besides, it predicts temperatures possibly 2°-3°C too low. A difference of 4.25°C at 40,000 ft and 3.25°C at 30,000 ft exists between criteria for "saturation" and for a trail that is visible at a distance. *Subject Headings: 1. Contrail forecasting 2. Jet aircraft.—M.R.*

ARTIFICIAL PRECIPITATION

See also: Weather Control Committee Report, 9.8-1; Weather modification and cloud physics bibliog. (Thuronyi et al.), 9.8-47; Precip. forecasting (Courvoisier), 9.8-134.

9.8-144

551.509.617

Dessens, Henri and Dessens, Jean, **La formation artificielle de grands cumulus producteurs de pluie.** [Artificial production of large cumulus rainclouds.] *Académie des Sciences, Paris, Comptes Rendus*, 243(11):814-817, Sept. 10, 1956. DLC—Five experiments are described

in which cumulus clouds yielding weak precipitation were produced in clear sky conditions by brush fires lighted near Lukolela (Belg. Congo) in July 1956. Precipitation was slight because S.E. currents prevented the cloud tops from reaching the freezing level; for the same reason the use of seeding agents (AgI and NaCl) was ineffective. Apart from the case of supercooled stratus clouds, the conflagration method is claimed to be the first to produce precipitation reaching the ground in drops having diameters of several mm. The direct effect of the fire cannot be doubted, as the clouds were produced in an otherwise cloudless sky and no other precipitation fell near the experimental site during the whole month. *Subject Headings:* 1. Cloud seeding with fires 2. Artificial precipitation 3. Belgian Congo.—G.T.

9.8-145

551.509.617

Dufour, L. (*Inst. Roy. Météor., Uccle, Belgium*), *Quelques considérations sur les précipitations artificielles*. [Comments on artificial precipitation.] *Scientia*, Milan, 91 (528):114-118, April 1956. DWB, DLC—The author shows that, even though artificial precipitation was achieved without a doubt in certain cases, the problem cannot be considered as solved. Artificial precipitation can be produced only in regions where the atmospheric circulation would allow it. The economic usefulness of large-scale seeding is examined. The conclusion is that for the present it would be preferable to reduce large-scale seeding experiments and concentrate instead on purely scientific research. *Subject Headings:* 1. Cloud seeding.—A.V.

9.8-146

551.509.617:551.574

Palomares Casado, Manuel, *Producción de precipitaciones atmosféricas por coagulación entre gotas de volumen muy diferente*. [Production of atmospheric precipitation by coagulation between drops of very different volume.] *Revista de Geofísica*, Madrid, 15(57):35-41, Jan./March 1956. fig., 6 refs., 5 eqs. Spanish and English summaries p. 35-36. DWB—Theoretical study of precipitation from liquid water drop clouds, for the purpose of determining the feasibility of producing artificial rain by introducing drops that exceed a critical size at the time when the small size of drops or lack of turbulence prevents natural precipitation. The ratio between the size of the drops introduced into the cloud and the density distribution in the clouds, the distance the drop must travel to reach a given size, time involved, and amount of rain theoretically evoked, are considered on a mathematical basis but without concrete numerical examples. *Subject Headings:* 1. Cloud seeding with water 2. Drop coagulation.—From author's abstract.

9.8-147

551.509.617

Ramdas, L. A. (*Met. Office, Poona*), *Methods of testing the efficacy of experiments of artificial rain-making*. (In: Symposium on Artificial Rain, New Delhi, Feb. 1953, *Proceedings and Papers*. pub. 1955. p. 88-91. table, 3 refs.) DWB—Large scale field (ground, air and rain gauge) experiments and detailed laboratory work must be conducted if proper evaluation of cloud seeding results is to be performed. Both cloud physicists and statisticians should take part in the program. Regular interval seeding to see if a periodicity is set up, or random selection of $\frac{1}{2}$ of clouds selected to seed and $\frac{1}{2}$ not to seed, are two ways of getting objective information on efficacy of seeding. *Subject Headings:* 1. Cloud seeding potentialities 2. Cloud seeding evaluation 3. Cloud seeding experiments.—M.R.

9.8-148

551.509.617

Roy, A. K. (*Met. Office, New Delhi*), *Experiments on precipitation control and evaluation of their results*. (In: Symposium on Artificial Rain, New Delhi, Feb. 1953, *Proceedings and Papers*. pub. 1955. p. 78-87. 5 refs.) DWB—Conditions necessary for rain to occur in the seeding of cold clouds, warm clouds and evaluation of results of seeding in India and abroad are discussed with a view towards an understanding of the complexity of the problem which has been over-simplified by many. In the case of the Calcutta experiments (BANERJI and MUKHERJI, 1955) the fact that during the monsoon season natural rain occurs on 96% of the days within 50 mi of Calcutta is pertinent but was overlooked in evaluation of the results. *Subject Headings:* 1. Cloud seeding experiments 2. Cloud seeding evaluation 3. Calcutta, India.—M.R.

9.8-149

551.509.617

†Schaefer, Vincent J., **Artificially induced precipitation and its potentialities.** (In: International Symposium on Man's Role in Changing the Face of the Earth, Princeton, N. J., June 1955, [Proceedings], ed. by W. L. Thomas, Jr. Univ. of Chicago Press, 1956. p. 607-618. Bibliog. p. 617-618.) **DLC** (G56.I63)—The author briefly discusses the events leading to the discovery that dry ice and AgI can act to induce artificial precipitation and then considers various techniques used in weather forecasting and their inadequacies, the importance of weather forecasting of more extensive knowledge on the concentration and type of condensation nuclei present in the atmosphere, the temperature conditions associated with ice-crystal nuclei formations of various types with formation of cirrus clouds, etc., the production of nuclei by dry ice and AgI, etc., formation of coalescence rainfall, the formation of rain and hail from clouds below 0°C level, the objectives and results of Project Cirrus, clouding seeding operations outside the U. S., the results of large scale seeding activities as reported by ELLIOTT and STRICKLER, research on the modification of storms by cloud seeding, etc. *Subject Headings:* 1. Artificial precipitation 2. Cloud seeding 3. Project Cirrus 4. Cloud seeding effectiveness.—*I.L.D.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

See also: Aeromet. textbooks (Georgii), 9.8-5.

9.8-150

551.510:551.510.528

Defant, F. and Taba, H. (*both, Internat. Met. Inst., Stockholm*), **Threefold structure of the atmosphere and the characteristics of the tropopause.** *Tellus*, Stockholm, 9(3):259-274, Aug. 1957, 14 figs., 3 tables. **DWB, DLC**—All available soundings for Jan. 1, 1956 have been studied with respect to their tropospheric and stratospheric temperature structure and with emphasis on the height and form of the tropopause. It was found that the latitudinal influence on the total vertical structure of the soundings was not dominating, but rather the location of the soundings with respect to the two main westwind maxima (polarfront jet and subtropical jet) of the westerlies seemed to be important. A selection of soundings according to this principle (north of polarfront jet, between the two jets, south of subtropical jet) made it possible to distinguish between different types of soundings. This fundamental difference is discussed and will form the basis for future studies of world wide circulation changes. Furthermore, the distribution of tropopause height and temperature has been mapped and studied on a hemispheric scale. Each of the above mentioned types possesses a typical vertical temperature structure and a characteristic tropopause height. Two rapid changes in tropopause height (tropopause breaklines) connected with the main westwind belts separate areas possessing an almost uniform tropopause level. Inside each of these areas a remarkable quasi-barotropic structure of the upper tropospheric layers is shown. Similar discussion has been devoted to the structure of soundings inside or close to the jets or the breaks in tropopause height. Here the soundings have a more complicated vertical structure and their interpretation becomes difficult. *Subject Headings:* 1. Atmospheric structure 2. Tropospheric temperature 3. Stratospheric temperature 4. Tropopause formation.—*Authors' abstract.*

9.8-151

551.510.41:546.296

†Müller, Theodor (*Innsbruck*), **10 Jahre Aranmessung und Aranlehre.** [10 years of aran measurements and theory.] *Wetter und Leben*, Vienna, 8(8/11):219-225, 1956. 2 tables, Bibliog. **DLC**—The various propositions of the aran theory propounded by CURRY since 1916 and the validity of his propositions in the light of subsequent research are examined. The discussion covers the following: aran as the total oxidizing substance of the atmosphere neutralized by KI; the Curry-Dirnagl apparatus for routine measurements of aran; relationship of ozone at the earth's surface to cold and warm fronts; the existence of two extreme weather situations, W with low surface ozone concentration and K with high surface ozone

concentration; the surface ozone as the sole biologically effective substance in the atmosphere and the existence of ten biologically extremely different human types. All these assertions are critically examined and contributing data are presented. *Subject Headings:* 1. **Aran** 2. **Ozone distribution.**—*I.L.D.*

ATMOSPHERIC POLLUTION

See also: Carbon monoxide poisoning (Effenberger), 9.8-90.

9.8-152

551.510.4

Schueneman, Jean J., **The Denver Area air pollution problem.** Prepared at the request of the City and County of Denver Dept. of Health and Hospitals and Building Dept. and the Tri-County Health Dept. Cincinnati, Ohio, Robert A. Taft Sanitary Engineering Center, June 1957. 78 p. 3 figs., 17 tables, 36 refs. DWB—On p. 25-31 of this monographic survey report on air pollution factors in the Denver area, there is a general discussion of the meteorological factors, especially drainage (SW) winds at night and upslope (NE) winds in the daytime (which give a return of pollution carried downwind in the early morning hours when it is stable). In the evening the greater instability carried pollution up and away. This knowledge gives an opportunity for industrial planning when new factories or industries are located near the city. *Subject Headings:* 1. **Atmospheric pollution studies** 2. **Denver, Colo.**—*M.R.*

9.8-153

551.510.42:551.575

Sciacchitano, Angelo, **Smog, problema del giorno.** [Smog, problem of the day.] *L'Unità*, Florence, 35(6):881-888, Nov./Dec. 1955. fig. DLC (G1.U6)—General discussion of smog, its dire consequences in U. S., England, Germany, etc., and laws for control, with special reference to Milan, Italy where the problem has been acute. *Subject Headings:* 1. **Smog** 2. **Milan, Italy.**—*M.R.*

STRUCTURE OF THE ATMOSPHERE

9.8-154

551.510.5:551.508.4

Simmons, Gustavus J. (*Dept. of Physics, Univ. of Oklahoma, Norman*), **An appraisal of photon counter measurements of upper atmosphere parameters.** *Journal of Geophysical Research*, Wash., D. C., 62(4):565-571, Dec. 1957. 2 figs., table, 5 refs., 9 eqs. DLC—model atmosphere is computed consistent with the measurements of O₂ concentration and ambient density between 100 and 125 km made by BYRAM, CHUBB, and FRIEDMAN (see 1 and 2 of "References" at end of paper) of the Naval Research Laboratory and the parameters of the Rocket Panel model atmosphere (5) below 60 km. The resulting temperature gradient above 100 km is greater than can be supported by the atmosphere (4). No physically reasonable alteration of the temperature profile in the 60 to 100 km region produces acceptable temperature gradients above 100 km. It is concluded that the densities given by photon counting technique are incompatible with other atmospheric information, and are probably consistently low; and, further, that if the general nature of the density variation as determined by this technique is correct, the resulting temperature segment above 100 km is essentially the same as derived by F. JONSON (4) from considerations of thermal conductivity. *Subject Headings:* 1. **Upper atmosphere structure** 2. **Photon counter measurements.**—*Author's abstract.*

9.8-155

551.510.52

Schuuring, C., **De tropopause en haar gedragingen.** [The tropopause and its behavior.] *Hemel en Dampkring*, The Hague, 54(7/8):147-149, July/Aug. 1956. fig. DWB, DLC—The characteristics of the tropopause and its definitions by the WMO are discussed. The phenomenon of the occurrence of more than one tropopause (POLINEN-HAURWITZ) is considered. *Subject Headings:* 1. **Tropopause** 2. **Multiple tropopause.**—*I.L.D.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Pop. sci. books** (Zavarina), 9.8-12; **Pop. sci. books** (Harang), 9.8-14; **Atmos. structure** (Defant, Taba), 9.8-150; **Atmos. tides** (Sawada), 9.8-194; **Meteor ionization**, 9.8-206; **Ionospheric drift meas.** (Rumsey), 9.8-207; **Eclipse effects on ionosphere** (Nicolet), 9.8-265.

9.8-156

523.7:551.510.535

Hulburt, E. O. (*IGY U. S. Nat. Committee*), **Variations of the ionosphere and of the solar intensity with sunspots.** *National Academy of Sciences, Wash., D. C., Proceedings*, 43(1):92-95, Jan. 1957. fig., 9 refs., 4 eqs. **DLC**—Average yearly electron densities for the E region were calculated from Wolf sunspot numbers according to a formula developed in this paper. The calculated values are plotted against observed E region data for 1931-1954 with good agreement, revealing the Wolf sunspot number as "a good indicator of the intensity of soft X-rays or short ultraviolet wavelengths which cause the E region." *Subject Headings*: 1. Solar influences on ionosphere 2. E layer ionization.—G.T.

9.8-157

551.510.535:523.75

*Lincoln, J. Virginia, **SID-type phenomena and solar flares.** *U. S. National Bureau of Standards, NBS Report*, 5065, April 26, 1957. 5 p. 4 figs. **DWB**—Not only SID's but gradual ionospheric disturbances (SWF) are associated with solar flares in 79% of the cases and with GWF in 85% of the cases (based on 69 selected dates). Sample records are presented and analyzed. *Subject Headings*: 1. Sudden ionospheric disturbances 2. Solar flare effects on ionosphere.—M.R.

9.8-158

551.510.535:621.396.8

Wait, James R. (*Natl. Bureau of Standards, Boulder, Colo.*), **The attenuation vs. frequency characteristic VLF radio waves.** *Institute of Radio Engineers, N. Y., Proceedings*, 45(6):768-771, June 1957. 10 figs., 7 foot-refs., eqs. **DLC**—The theoretical dependence on frequency of the attenuation of the wave guide modes in VLF propagation is discussed in some detail. It is indicated that most of the published experimental data between 1 and 30 kc was compatible with the sharply bounded model of the ionosphere with a reflecting height of about 70 km during the day and 90 km during the night. *Subject Headings*: 1. VLF propagation 2. Ionospheric attenuation.—*Author's abstract.*

9.8-159

551.510.535:621.396.8

Wait, James R. and Murphy, A. (*both, Natl. Bureau of Standards, Boulder, Colo.*), **The geometrical optics of VLF sky wave propagation.** *Institute of Radio Engineers, N. Y., Proceedings*, 45(6):754-760, June 1957. 5 figs., 3 tables, 10 foot-refs., eqs. **DLC**—At distances not exceeding 1500 km, it is convenient to calculate the field strength of a VLF transmitter by geometrical optics. In such computations, it is usual to assume some equivalent height for the (ionospheric) reflecting layer with a reflection coefficient that does not vary with angle of incidence. In the present paper, the ionosphere is taken to be a homogeneous ionized medium with a sharp lower boundary. The reflection coefficient, which is a function of angle of incidence, is utilized to compute the strength of the single and multiple hop sky waves. Combining these with the numerical results of the amplitude and phase of the ground wave, the total field is obtained. The theoretical field-strength-vs-distance curves compare favorably with the experimental data of Heritage for frequencies of 16.6, 18.6, and 19.8 kc over daytime paths in the Pacific Ocean. Finally, diffraction by the earth's bulge of the first hop sky wave is considered. This effect is important at ranges greater than 1200 km or so. *Subject Headings*: 1. VLF propagation 2. VLF field strength 3. Ionospheric radio wave reflection.—*Authors' abstract.*

9.8-160

551.510.535:551.510.62

Wait, J. R. and Howe, H. H. (*both, Natl. Bur. of Standards, Boulder, Colo.*), **The waveguide mode theory of VLF ionospheric propagation.** *Institute of Radio Engineers, N. Y., Proceedings*, 45(1):95, Jan. 1957. 2 figs., 5 refs., 3 eqs. **DLC**—The lower boundary (earth's

surface) is a sharply bounded isotropic medium, but the upper boundary (the ionosphere) is a diffuse anisotropic medium. However, for frequencies around 16 kc or less it can be assumed that both boundaries are sharp and isotropic, so a simple solution of the waveguide mode theory becomes possible under certain assumptions (vertically-polarized field at large ranges). Geometrical path calculations, integrated for complex patterns or modes, and allowing for curvature of earth and conductivity of ground (a very important factor) lead to attenuation rate curves and calculations (as examples) of actual long distance propagation cases. The detailed calculations will be presented in a later paper. The dependence of spheric waveforms on geographic location is said to be due to influence of ground conductivity on dominant mode.

Subject Headings: 1. Waveguide mode theory of VLF propagation 2. VLF propagation 3. Sferics propagation.—*M.R.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: Heat exchange and water temp. (Neumann), 9.8-69; Showalter's Stability Index (Schuetz), 9.8-105; Atmos. turbulence (Lettau), 9.8-197; Precip. mechanism (Peterson), 9.8-224.

9.8-161

551.511

Roll, H. U., *Der Austauschkoeffizient über dem Meer*. [Exchange coefficient over the sea.] *Beiträge zur Physik der Atmosphäre*, Frankfurt a.M., 30(2/3):149-169, 1958. 11 figs., 3 tables, 18 refs., 7 eqs. English and French summaries p. 149. DWB, DLC—After explanation of the principle particulars and difficulties attached to investigations on austausch over sea, measuring methods in use at present are described. Integral methods deliver results which represent the total vertical momentum transport whilst differential methods mostly deal with parts of the spectrum of turbulence only. It is possible to make certain statements on the climatology of turbulence and on the structure of convection over sea by means of qualitative methods. The discussion of investigation methods is followed by a comprehensive representation of results. Amongst other subjects the following topics are discussed: The layer ranging from sea level up to 10 m alt., the turbulence wind fluctuations in the height region 0 to 1500 m (particularly the order of magnitude of the individual components for different spectral areas, their height distribution and their dependence on thermal stability), the vertical profile of shearing stress and the coefficient of eddy conductivity in the north-easterly tradewinds. **Subject Heading:** 1. Exchange coefficient over sea.—*Author's abstract.*

9.8-162

551.511:551.551

Slobodov, B. IA., *K uchetu turbulentnogo obmena v zadache o raspredenenii davleniia i vetra v atmosfere*. [Calculating turbulent exchange in the problem of the distribution of pressure and wind in the atmosphere.] *Akademii Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 8:1001-1004, Aug. 1956. 3 refs., 22 eqs. DWB, DLC—An attempt is made to generalize E. N. BLINOV's equation for calculating the time-averaged distribution of pressure and wind in the atmosphere for a given distribution of temperature for a turbulent atmosphere. Both the effects of vertical and horizontal macroturbulence are evaluated by using some approaches of A. M. MKUTARIAN and that of E. N. BLINOV. **Subject Headings:** 1. Turbulent exchange 2. Turbulence theory.—*I.L.D.*

9.8-163

551.511.13

Glansdorff, P. and Passelcq, P., *Sur les transformations irréversibles voisines d'un état stationnaire pour des contraintes à courants constants*. [Irreversible transformations bordering a stationary state in the case of forced flow in constant currents.] *Académie Royale de Belgique, Bulletin de la Classe des Sciences*, 5th Ser., 63(3):188-194, March 1957. 4 refs., 15 eqs. DLC—A differential property of the production of entropy in the vicinity of a stationary state, established earlier by P. GLANSORFF and I. PRIGOGINE is applied to another case of forced flow (constant currents). **Subject Headings:** 1. Thermodynamic theory 2. Entropy.—*A.V.*

GENERAL CIRCULATION

See also: Turbulent flow of air (Ruzin), 9.8-198.

9.8-164

551.513

†Pogosian, Kh. P., *Sovremennyye vozzreniia na obshchuiu tsirkulatsiiu atmosfery*. [Modern views on the general atmospheric circulation.] (In: Budyko, M. I. (ed.), *A. I. Voeikov i sovremennyye problemy klimatologii*. Leningrad, 1956. p. 63-83. 8 figs., table, 60 refs.) DWB—After a brief summary of the various approaches employed to study the general circulation of the atmosphere, the author presents a concise account of the present state of knowledge of the general circulation of the atmosphere in the lower, middle and high latitudes and outlines the various problems of the general circulation which need to be investigated. Numerous climatic charts of the general circulation are presented. *Subject Heading: 1. General circulation.*—I.L.D.

9.8-165

551.513:551.58

Pokrovskaya, T. V., A. I. Voeikov i problema mirovoi pogody. [A. I. Voeikov and the problem of world weather.] (In: Budyko, M. I. (ed.), *A. I. Voeikov i sovremennyye problemy klimatologii*. Leningrad, 1956. p. 193-204. 5 figs., table, 14 refs.) DWB—After summarizing A. I. Voeikov's studies and concepts of the general circulation, the monsoon exchange of air between the Northern and Southern Hemispheres, the problem of world weather, etc., the author summarizes modern work done on this problem, particularly in the Soviet Union. This includes: V. Iu. VIZE's work on the simultaneity of hydrometeorological changes in the Arctic and Antarctic, the work of L. A. VITEL's on Atlantic, European and Western Siberian weather involving eight separate regions in which various features are investigated with the aid of correlation coefficients, the comparison of the climatic regimes of various regions of European U.S.S.R. and the correlation between the climates of various sub-regions. Data are presented on the frequency of the anticyclonic circulation in the Azores and in Siberia according to 10-year running means and intensity (I_A) of the Atlantic circulation on days before and after magnetic storms, etc. *Subject Headings: 1. Global circulation 2. World climate 3. Voeikov, A. I.*—I.L.D.

9.8-166

551.513:551.557.5

Genève, René and Jacquemard, Georges, *Coupe méridienne de l'atmosphère au-dessus du Nord-Ouest de l'Afrique*. [Meridional section of the atmosphere over northwestern Africa.] *Académie des Sciences, Paris, Comptes Rendus*, 244(6):793-796, Feb. 4, 1957. 4 charts, ref. DLC—Vertical sections extending up to 60 mb from 44° to 4°N lat. (Nîmes-Bouala, approximately along the Greenwich meridian) are presented for Jan., April, July and Oct. 1955 on the basis of aerological data for seven stations. The tropical branch of the westerly jet stream clearly appears on all four charts; its variations in space appear to follow those of the intertropical front. The study confirms the existence of a continuous westerly jet stream around the globe, and also reveals the discontinuous nature of the easterly jet. *Subject Headings: 1. Meridional cross sections 2. Jet stream profiles.*—G.T.

9.8-167

551.513:551.557.2

†Portugal, José Blanc de (*Dir. Angola Met. Service*), *Introdução ao estudo das correntes de jacto*. [Introduction to the study of the jet stream.] Luanda, Serviço Meteorológico de Angola, 1955. 34 p. 4 figs., 37 refs. English summary p. iii. DWB(M57.2 P853i)—A dated and nonsystematic review of the literature on the jet stream published in America, Sweden, France, etc. up to 1950, when the lecture was given. The present pamphlet is merely reprinting of this paper, with introductory note by the author dated Oct. 6, 1955. Current views on structure, theories, local studies, dimensions, movement, wind speed, temperature field, precipitation, forecasting, etc. are summarized in a nonmathematical but graphical manner. *Subject Heading: 1. Jet stream structure.*—M.R.

9.8-168

551.513.7:551.509.33:551.524.3

†Suda, K., *On the unusual hot summer of 1955*. *Journal of Meteorological Research*, Tokyo, 8(8):463-472, Oct. 1956. 14 figs., 10 refs. In Japanese; English summary p. 463.

DWB, DLC—A study of temperature anomalies in July 1955 in relation to surface pressure and 500 mb Northern Hemisphere patterns. Composite charts for the Far East are prepared for temp. and precip. patterns during 10 hot Julys and 10 cold Julys. The zonal index position of jet stream, pressure anomalies, etc. are all related to the temp. and precip. anomalies by means of cross sections. *Subject Headings: 1. Hot summers 2. Atmospheric circulation anomalies 3. Synoptic studies.*—*M.R.*

ATMOSPHERIC DISTURBANCES

See also: Aeromet. textbooks (Georgii), 9.8-5; *Radar hurricane tracking* (Senn, Hiser), 9.8-107; *Hurricane reconnaissance* (Simpson), 9.8-112; *Sea and swell in tropical cyclones* (Mackey, Whittingham), 9.8-138; *Objective tornado forecasting, Great Plains, U. S.* (Whiting, Bailey), 9.8-140; *Thundercloud electrification* (Borbély), 9.8-278; *Thunderstorm electricity* (Brook), 9.8-279; special bibliography on *Radar Meteorology*, p. 1005.

9.8-169

551.515:551.461.2:00

Saint-Guily, Bernard, *Symposium sur les ondes de tempête, Wormley-London, May 27-31, 1957: compte-rendu sommaire.* [Summary of Proceedings of the Symposium on Storm Surges, Wormley and London, May 27-31, 1957.] *France. Comité Central d'Océanographie et d'Etude des Côtes, Bulletin d'Information*, 9(8):406-410, Sept./Oct. 1957. **DWB, DLC**—Communications made at the symposium are briefly summed up. The subjects covered are: (a) effects of atmospheric pressure and wind on the sea surface, and bottom friction; (b) empirical and statistical forecasting methods and (c) observation and analysis of long waves and response of an ocean to wind action. *Subject Headings: 1. Storm surge symposia. I. Symposium on Storm Surges, Wormley and London, May 27-31, 1957.*—*G.T.*

9.8-170

551.515.22

†*Palmén, E. (*Academy of Finland*), *Formation and development of tropical cyclones.* (Imperial Tropical Cyclone Symposium, Brisbane, Dec. 1956, *Proceedings*. Pub. Dec. 1956. p. 213-231. 8 figs., 3 tables, 23 refs., 15 eqs.) **DWB**—The thermodynamic processes involved in the development of tropical cyclones are treated in great detail and the conditions illustrated by actual examples, diagrams, charts, etc. It is shown that a hurricane can hardly form except over the ocean where sea surface temp. is 25°-27°C or more and the Coriolis parameter exceeding that which would be found 5°-8° latitude from the equator. The sea level pressures in the center could not reach the very low values observed, merely due to release of latent heat on lifting but only by the added effect of adiabatically warmed descending air which replaces overflowing air during the deepening, but not necessarily a result of dynamic instability. Actual structure and thermodynamics of the "eye" is discussed and illustrated. Finally, the energy budget of the mature and decaying cyclone is treated quantitatively, to show which forces are important and which are of less importance in dissipation of the energy of a system. Cooling of the cloud layer would reduce the release of latent heat below that of the frictional dissipation, but increased friction over land and cutting off of moisture source would upset the balance to a greater degree. An invasion of cold air at the surface could revive the cyclone but it would then become extratropical. *Subject Headings: 1. Tropical cyclone formation 2. Tropical cyclone dynamics.*—*M.R.*

9.8-171

551.515.23:551.509.31

§Phillips, E. F. (*Div. Office, Brisbane*), *Warm tongue steering of tropical cyclones.* *Australian Meteorological Magazine*, Melbourne, No. 13:19-30, June 1956. 10 figs., 3 tables, refs. **DWB**—R. H. SIMPSON's rule (71-76, Sept. 1956, *MAB*) that hurricanes tend to move in the direction of a tongue of warm light air that may be identified by height difference (700-500 mb) charts, and which extends in a direction parallel to the axis of the storm for 800 to 1200 mi in advance of the center, was tested on 10 tropical cyclones in Queensland and West Australia during 1950-1955. If the thickness increases along the warm tongue, the cyclone should intensify—if it decreases, the cyclone should tend to fill. It was found that SIMPSON's rule worked in about 90% of the cases. In the 10% that failed, the warm tongue was ill-defined and the cyclone moved toward areas of positive thickness tendency. Synoptic charts are included. *Subject Headings: 1. Steering of hurricanes 2. Thickness charts (700-500 mb) 3. Tropical cyclone movement 4. Australia.*—*M.R.*

9.8-172

551.515.31

Pate, Floyd C., **Windstorms and tornadoes in Alabama and the Southeast.** Montgomery, Ala., W.B. Airport Station, March 11, 1957. 16 p. 8 figs., 6 refs. DWB—On the basis of much personal experience and somewhat limited statistics, the writer suggests that tornadoes probably do not occur in a given locality in Alabama when conditions favor severe straight winds, unless the prevailing straight winds are generally nearly strong enough to be damaging. For tornadoes to occur, thunderstorm overturning must be mainly at high levels so that no down drafts reach low levels to interfere with tornado formation. Increasing winds with height are considered to be the means of producing the majority of tornado airmasses when upstream temperature and moisture gradients are favorable. An experiment with water illustrates how this wind system could possibly furnish the impulse which causes a tornado to develop from the side of a thunderstorm. Due to the absence of strong low-level convection, the energy of a tornado comes from heat of condensation as air moves into the whirl and is lowered in pressure without being lifted. A resulting hypothesis is given to account for the strict limitation of the diameter of a tornado. *Subject Heading: 1. Tornado formation.*—*Author's abstract.*

9.8-173

551.515.41

Nakayama, A., **Thermodynamic and dynamic effects on the development of strong thunderstorm.** *Journal of Meteorological Research*, Tokyo, 9(3):157-161, March 1957. 5 figs., 4 tables, 8 refs., 3 eqs. In Japanese; English summary p. 157. Watanabe, T., [Comments on] A. Nakayama: **The thermodynamic effect on the developments of strong thunderstorm and reply by A. Nakayama.** *Ibid.*, 9(9):683-684, 1957. Sugiura, S., [Comments] and Reply by Nakayama. *Ibid.*, 9(10):755-756, 1957. DWB, DLC—Strong thunderstorms frequently occur near the center of a remarkable cold trough. In this case the process of development into a violent thunderstorm is as follows: 1) The lower layer is unstable and cumulus clouds develop sooner, before the cold air advection takes place in upper layer. 2) Under this condition, when cold air penetrates the upper layer, cumulus grows into cumulonimbus. 3) In order to develop further, it is necessary to assume the buoyancy force caused by dynamical effect, because in the upper part of a thunderstorm cell there is no temperature difference between the inside and outside of the cell. To explain such a process, the author presents the buoyancy equation:

$$\frac{\partial}{\partial r} \left(\rho \frac{dw}{dt} \right) = -g \frac{\partial \rho}{\partial r} - \frac{1}{R} \rho \cdot 2v\theta \cdot \frac{\partial v\theta}{\partial z} + \frac{1}{R^2} \rho \cdot v\theta^2 \cdot \frac{\partial R}{\partial z},$$

where (r, θ, z) is the cylindrical coordinate and R the curvature of stream line. The left side of this equation indicates the variance of buoyancy force between the inside and outside of cell. The 1st term of the right side is buoyancy force caused by thermodynamic effect; the 2nd and the 3rd, those by dynamic ones. In case of a violent thunderstorm, the 1st term is most important in lower layer and the 2nd is important in upper portion of troposphere. The 3rd term cannot be estimated, because of the lack of data near Japan. The 2nd term of the right side means that the larger the wind velocity, vertical wind shear and curvature of streamline, a thunderstorm is more likely to develop into a violent one. It seems that most violent thunderstorms satisfy these conditions. *Subject Headings: 1. Thunderstorm dynamics 2. Severe thunderstorms.*—*Author's abstract.*

9.8-174

551.515.73

Romanov, N. N., **Nekotorye osobennosti dvizheniia antitsiklonov nad Srednei Aziie i smezhnymi s nei territoriiami.** [Certain characteristics of the movement of anticyclones over Central Asia and adjacent territories.] (In: *Akademiia Nauk Uzbekskoi SSR. Institut Matematiki i Mekhaniki, Meteorologiya i gidrologiya v Uzbekistane.* Tashkent, 1955. p. 151-157. 2 figs., 3 tables, 5 refs.) DLC—The results of a study of a 10-year record of aerological maps in order to ascertain the velocity of anticyclones over Central Asia and adjacent regions are analyzed, and numerical and graphical data are presented on the mean monthly and mean annual velocity of cyclones and anticyclones for the period 1942-1951 in km/hour, mean monthly maximum velocity of anticyclones for this decade, zonal distribution of velocity of anticyclones, and relative variations of the velocity of cyclones and anticyclones in different

latitudinal zones. The more southerly is the trajectory of an anticyclone the greater is its velocity. Anticyclones moving through northern and central regions of Central Asia, at first usually slow down, that is, they enter Central Asia at a reduced velocity, but subsequently they lose this rate by acceleration. *Subject Headings: 1. Anticyclone movement 2. Central Asia.—I.L.D.*

9.8-175

551.515.71:551.515.11:551.590.22

Kapás, Mrs. László, *A hold fényváltozásainak hatása a ciklonok és anticiklonok keletkezésére*. [Effect of phases of the moon on the formation of cyclones and anticyclones.] *Időjárás*, Budapest, 55(9/10):282-283, Sept./Oct. 1951. Russian and French summaries p. 311. **DLC**—Curves of Mediterranean cyclone frequency (390 cyclones, 1931-34 and 1946-51), Icelandic cyclone (1946-51) and Azores anticyclone (51 cases 1946-51) frequencies show an accumulation of cyclogenesis and anticyclogenesis around full moon and new moon. *Subject Headings: 1. Lunar effects 2. Cyclogenesis 3. Anticyclogenesis.—G.T.*

9.8-176

551.515.7

Koppány, György, *Anticiklongyakoriság az Északi-félgömbön*. [Frequency of anticyclones over the Northern Hemisphere.] *Időjárás*, Budapest, 61(1):41-45, Jan./Feb. 1957. 2 figs., 4 refs. French summary p. 41. **DLC**—On the basis of U. S. Weather Bureau Synoptic Weather Maps for 1949-1952, maps of anticyclone frequencies over the Northern Hemisphere are presented. The four maps show lines of equal number of surface and 500 mb anticyclones for Jan. and for July. In Jan. thermal anticyclones are most frequently found over continents in the lee of high mountain ranges; dynamic anticyclones (those appearing on 500 mb charts) mostly occur in the subtropical regions. In July the anticyclones of thermal and of dynamic origin cannot be readily separated. The connection of Arctic air masses with subtropical anticyclones is best discernible over the North American continent in Jan. No significant ultrapolar processes can be found for the period analyzed. *Subject Headings: 1. Anticyclone frequencies 2. Northern Hemisphere.—G.T.*

9.8-177

551.515.8

Gensler, Gian Alfred (*Meteorologist, Glattbrugg-Zurich, Switzerland*), *Die Klassifikation der Fronten*. [Classification of fronts.] *La Météorologie*, Paris, Ser. 4, 45/46:301-303, Jan./June 1957. 2 refs. German, French and English summaries p. 301. **DWB**—The Alps weather statistics includes a classification of fronts comprising the three usual types: secondary, cold fronts and stationary fronts. However, not all belts of bad weather can be explained by fronts, thus convergence zones within the same air mass are proposed to be introduced. Specifications separating a surface front from an upper one (surface friction layer influence) as well as uniform naming of the two main cold front types are missing; furthermore several opinions on occlusions exist. *Subject Headings: 1. Frontal classification 2. Occlusions.—Author's abstract.*

RADIATION AND TEMPERATURE

RADIATION

See also: Precipitable water data (Martin), 9.8-18; *Infrared radiation transmittance* (Olsen et al.), 9.8-20; *IGY cosmic ray program* (Camerini), 9.8-24; *Sea-going cosmic ray obs.*, 9.8-67; *Solar energy generators, U.S.S.R.* (Baum et al.), 9.8-83; *Solar furnaces* (Bilancini), 9.8-84; *Solar furnaces* (Bliss), 9.8-85; *Insolation and solar heating, Paris* (Escher-Desrivières, Grisollet), 9.8-89; *Solar energy estimation, Australia* (Sapsford), 9.8-96; *High alt. research* (Powell), 9.8-110; *Solar geomagnetic relationships* (Herinck), 9.8-263; *Nuclear reactions in auroras* (Singer), 9.8-285

9.8-178

551.521:551.576

Fritz, Sigmund (*U. S. W. B., Wash., D. C.*), *Solar radiation and the lower atmosphere*. *National Academy of Sciences, Wash., D. C., Proceedings*, 43(1):95-104, Jan. 1957. 4 figs., tables, 26 refs. **DLC**—Current knowledge on influences of the variable and the nonvariable

on upon atmospheric phenomena is reviewed. The problems discussed include the spectral emission of the quiet and disturbed sun, and its variations; atmospheric absorption of solar energy; solar corpuscular emission; solar-constant variations; and the role of cloudiness and cloud and earth albedo in the mechanism of solar energy transformation. Graphs are presented for diffuse energy as a function of depth below cloud top, and cloud albedo as a function of cloud thickness, mean free path and sun's zenith distance. *Subject Headings:* 1. Solar radiation 2. Atmospheric radiation 3. Radiation balance 4. Albedo of clouds. —G.T.

9.8-179

551.521:551.501.3

*Möller, Fritz and Volz, Friedrich, **Grundlagen, Einheiten und Formeln der atmosphärischen Strahlungsforschung.** [Principles, units and formulas of atmospheric radiation research.] (In: Linke, Franz, **Linkes Meteorologisches Taschenbuch.** New ed. Leipzig, 1957. 3:1-39. figs., tables, refs., eqs.) **DLC** (QC864.L53)—A thorough, systematic and yet concise presentation of the basic units, formulas and concepts used in atmospheric radiation calculations. The 11 sections cover: 1) physical constants used in radiation; 2) optical constants and units; 3) basic laws of geometric optics; 4) physical radiation laws; 5) color temperature, filters, photocells, refractivity, diffuse reflection and albedo, etc.; 6) astronomical formulas and concepts; 7) atmospheric extinction; 8) diffuse and sky radiation; 9) visibility; 10) heat radiation and 11) tables of the radiation balance of the Northern Hemisphere. *Subject Headings:* 1. Radiation constants 2. Radiation laws 3. Visibility constants 4. Radiation balance of N. Hemisphere.—M.R.

9.8-180

551.521.1

Migeotte, M., **L'utilisation de l'énergie solaire.** [Solar energy utilization.] *Revue des Questions Scientifiques, Louvain, 5th Ser.*, 18(4):161-175, April 1957. 6 figs., 5 refs.—After a brief summary of the general theory of solar energy, the author describes the various types of equipment using or capable of using solar energy (hot houses for distilling, warm-air water heaters, heaters for dwellings, solar furnaces, Bell solar battery). *Subject Heading:* 1. Solar energy utilization.—A.V.

9.8-181

551.521.18:551.508.25:551.507.321

Suomi, V. E.; Kuhn, P. M. and Staley, D. O., **Direct measurement of infrared radiation divergence to 160 millibars.** *Royal Meteorological Society, Quarterly Journal*, 84(360):134-141, April 1958. 4 figs., 8 refs., 8 eqs. **DWB, DLC.** Also issued as Wisconsin. Univ. Dept. of Meteorology, Contract Cwb-9132, Project Report, No. 5, Aug. 31, 1957. 4 figs., 7 refs., 6 eqs. **WB** (M21.61 S958d)—A simple, economical balloon-borne net radiometer is described. The net radiation is essentially obtained from the difference in fourth-powers of bottom and top radiating surfaces, and the internal conduction, which is proportional to the difference between bottom and top temperatures. The results of a measurement of net radiation to 50 mb are discussed. *Subject Headings:* 1. Infrared radiation instruments 2. Upper atmosphere radiation measurement 3. Balloon-borne radiometers.—Authors' abstract.

9.8-182

551.521.32:551.506.1:551.576.2

De Coster, M. and Schüepp, W., **Mesures de rayonnement effectif à Léopoldville.** [Measurements of effective radiation at Léopoldville.] *Belgium. Académie Royale des Sciences Coloniales, Bulletin des Séances*, 3(3):642-651, 1957. 3 figs., 3 tables, 14 refs. **DLC**—For more than a year, effective radiation was measured at Léopoldville by means of two different instruments: Angström and Tulipan pyrgeometers. In this publication the results obtained with the Angström pyrgeometer are summed up. Effective radiation with clear sky, and attenuation by cloudiness are analyzed. Relations between effective radiation and low clouds, and between effective radiation and medium clouds are examined. *Subject Headings:* 1. Effective radiation 2. Solar radiation data 3. Léopoldville, Belgian Congo.—A.V.

9.8-183

551.521.32:551.508.21

Schöne, Werner, **Bemerkungen zur Registrierung der Globalstrahlung mit dem Bimetall-thermographen nach Robitzsch.** [Remarks on recording global radiation with the Robitzsch

bimetal pyranograph.] *Zeitschrift für Meteorologie*, 11(1):11-14, Jan. 1957. table, 4 refs. DLC—In 1949-55 the bimetallic pyranograph at Gotha recorded lower global radiation in the morning than afternoon in Dec.-Feb. and higher in April-Sept. The excess in summer depended to some extent on ratio of sunshine duration a.m./p.m. It is attributed to incomplete temperature compensation of the instrument. The values of global radiation are too low. *Subject Heading: 1. Robitzsch pyranograph.—C.E.P.B.*

TEMPERATURE

See also: Hot summers (Suda), 9.8-168; Sea ice-temp. correlation (Rodhe), 9.8-192.

9.8-184

551.524.34:551.583.1

Thomas, M. K., Climatic trends along the Atlantic coast of Canada. *Royal Society of Canada, Ottawa, Transactions*, Ser. 3, 49:15-21, 1955. 5 figs., 5 refs. DLC—Analysis of temp. records (1890 to present) from a number of stations from Yarmouth, N. S., northward along the Newfoundland and Labrador coasts to Clyde on Baffin Island indicate a warming trend. An increase of 2° and 4° of decadal means of annual and winter temperatures during the past 30 yrs were observed and summer temperatures at their maximum in the early 1930' are now about 2° higher than prior 1920. *Subject Headings: 1. Temperature trends 2. Atlantic coast, Canada.—W.N.*

9.8-185

551.524.3

Galakhov, N. N., Ianvar' v Podmoskov'e. [January in the Moscow region.] *Priroda* 46(1):124-125, Jan. 1957. fig. DWB, DLC—Temperature extremes, experienced at Moscow in Jan., are summarized. In 1940, a 40° to 50°C frost killed many trees; in 1925 the weather was so warm that many migrating birds returned. *Subject Headings: 1. Temperature extremes 2. Moscow.—A.A.*

9.8-186

551.524.36(783

*Pengra, Ray F., Frequencies of daily occurrence of maximum and minimum temperatures at Huron, South Dakota each week of the year by five degree intervals together with highest and lowest temperature recorded and standard deviation of temperatures each week of the year. *South Dakota. Agricultural Experiment Station, Agricultural Economics Pamphlet* No. 83, March 1957. 14 p. almost entirely tables. DWB—(M:63 S726a)—Based on data for Huron, S. Dak., for 1881-1955, frequencies of daily maximum and minimum temperatures are presented for each 5°F interval for each week beginning with March 1 (so all weeks will begin with same data in any given year). A remarkable lack of dispersion is noted for warm season, but considerable dispersion in cold season is evident. *Subject Headings: 1. Temperature frequency distribution data 2. Weekly temperature frequencies 3. Huron S. Dakota.—M.R.*

9.8-187

551.524.36:612.014.4

Weiner, J. S., Human adaptability to hot conditions of deserts. (In: *Institute of Biology London, Biology of deserts*. London, 1954. p. 193-199. table, 8 refs.) DWB—The author discusses the heat load imposed by the desert conditions upon the human body, the ethnological characteristics of the various hot deserts, the evaluation of the discomfort of desert conditions in terms of effective temperature scale, an estimation of the working capacity of man in the desert on the basis of maximum cooling capacity, physiological adjustments to desert heat including salt intake, sweating and acclimatization failure, in physiological adaptation with circulatory failure, dehydration, sweat gland fatigue, etc., and the problem of desert and "racial selection." *Subject Headings: 1. Acclimatization 2. Heat tolerance 3. Deserts.—I.L.D.*

9.8-188

551.524.37(99

First South Pole temperature report. *Science*, Wash., D. C., 125(3254):925, May 10 1957. DLC—Radiosonde temperatures of -71°F at the surface (10,000 ft), -31°F at 13,300 ft and -62°F at 21,500 ft on March 27, 1957, and on April 2, 1957 -89°F was reported at the

ground at the South Pole station of the US-IGY network under PAUL SIPLE. *Subject Headings:* 1. Extreme minimum temperatures 2. South Pole temperatures 3. South Pole Station, Antarctica.—M.R.

9.8-189

551.524.37(52)

Kusakabe, Masao (*Fukuoka District Central Met. Obs.*), **Climatological investigation for frost injury protection.** *Journal of Agricultural Meteorology*, Tokyo, 12(1):21-23, July 1956. 3 figs., table. In Japanese; English summary p. 23. DWB—When they select the mean date of the last frost days as the standard day for frost injury protection, it frosts very frequently after this day. The author proposed the day corresponding to $\bar{M} + 2PE$ as the new standard day for frost injury protection, where $\bar{M}$ is the mean of the last frost days and PE is their probable error. As the so cold spring that it frosts after this day, occurs about 10% in probability, so this standard day is useful for the economical frost injury protection. Then the author calculated $\bar{M} + 2PE$ of various weather stations in Fukuoka Prefecture (Table 1), and drew their isogram (Fig. 2). Fig. 3 shows the daily frequency of frosting at Fukuoka. It frosts more frequently on 15~17, 22, 27 and 28, April, than the other days. These characteristic days are recognized at Iizuka, Saga and Hita. So, they must take care of frost injury on these days. *Subject Headings:* 1. Frost hazard 2. Fukuoka Prefecture, Japan.—*Author's abstract.*

SOIL TEMPERATURE

See also: Soil heat flux (Franssila), 9.8-114.

9.8-190

551.525.4(784)

Potter, Loren D. (*N. Dakota Agric. College, Fargo*), **Yearly soil temperatures in eastern North Dakota.** *Ecology*, Durham, N. C., 37(1):62-70, Jan. 1956. figs., 8 tables, 13 refs. DWB, DLC—"Soil temperatures at depths of 1 and 6 in. and at 1, 2, 3, 4, 5 and 6 ft were determined at 5 different sites varying in cultural practice and snow cover at Fargo, N. Dak. from July, 1952 to Aug., 1954." Measurements were based upon potentiometer readings of iron-constantan thermocouples. The author discusses the effect of vegetation on heat penetration into the soil, on maximum and minimum temperatures, on the duration of frost, thawing, and frost free period; the effect of deep snow upon temperature; the spring and fall temperature overturn in the soil, and the mean annual temperature at each depth. *Subject Headings:* 1. Soil temperature data 2. North Dakota.—I.L.D.

9.8-191

551.525.5:625.74

Kersten, Miles S. (*Univ. of Minnesota*) and Johnson, Rodney W. (*Engr., Hazlet and Erdal, Chicago*), **Frost penetration under bituminous pavements.** *National Research Council, Wash., D. C. Highway Research Board, Bulletin*, No. 111:37-62, 1955. 30 figs. (incl. photos), 5 tables, 4 refs. DWB (M25.5 N277fc)—Results of studies made of frost penetration in bituminous roads at 9 sites located in a 50 sq mi area just N. of St. Paul, Minn., during 1953-4 are analyzed and the climatic data presented in tables and graphs and the sites illustrated photographically. Temperature degree, days below freezing, depth of frost penetration, and a comparison of calculated and observed depths of frost are shown in tables and figures. Calculated depths (using STEFAN's equation), modified by a correction factor of 0.8 for air-surface, gave the best agreement, with differences averaging about 0.5 ft (greatest depth > 15 ft). Penetration is greatest with low moisture content of soil. Midnight-midnight rather than 6 p.m.-6 p.m. temperatures are recommended. *Subject Headings:* 1. Frost penetration in highways 2. Highway engineering 3. Minneapolis, Minn.—M.R.

WATER TEMPERATURE

See also: Heat exchange and water temp. (Neumann), 9.8-69.

9.8-192

551.526.6:551.524:551.311.8

Rodhe, Bertil (*Swedish Met. and Hydrological Inst.*), **A study of the correlation between the ice extent, the course of air temperature and the sea surface temperature in the Åland**

Archipelago. *Geografiska Annaler*, Stockholm, 37(3/4):141-163, 1955. 2 figs., 9 tables, 12 refs., 28 eqs. **DLC**—"With the main stress upon the growth of ice off the coast, the correlation between ice extent and air temperature, the latter being represented by a variate resulting from weighted averages of past temperature readings, is compared with the correlation between ice extent and sea surface temperature. The correlation coefficients are shown to be alike, but the variate of air temperature stress at definite ice extent since significant variations which are not found in the series of sea surface temperatures and which are probably due to the influence upon sea ice formation of other meteorological elements than air temperature, e.g., wind." *Subject Headings:* 1. Sea ice-temperature correlation 2. Åland Archipelago.—*Author's summary.*

PRESSURE AND WIND

PRESSURE

See also: Solar-pressure relationships (Palmer), 9.8-264.

9.8-193

551.543.1(969)

Reber, Grote (*Univ. of Tasmania, Hobart*), **Atmospheric pressure atop Haleakala.** *Australian Meteorological Magazine*, Melbourne, No. 18:50-54, Sept. 1957. 5 figs., ref. **DWB**—Pressure data taken for 28 months atop a 10,000 ft. high volcano in Hawaii, are analyzed for daily cycles. Periods with 24, 12 and 8 hrs are established. The amplitude and phase of these variations oscillate with the seasons in a characteristic manner; except the phase of the 8 hr variation which rotates backwards in time a full 360° in one year. No significant variation with a 6 hr period could be detected. *Subject Headings:* 1. Pressure periodicities 2. Haleakala Mt., Hawaii.—*Author's abstract.*

9.8-194

551.543.1:551.510.5

Sawada, R., (*Central Met. Obs., Tokyo*), **On the role of thermal excitation in the atmospheric tides.** *Geophysical Magazine*, Tokyo, 26(4):267-281, Aug. 1955. fig., table, 6 refs., numerous eqs. **DWB, DLC**—(1) A general equation of the vertical structure of tides is derived, which is essentially the same as that of WILKES (1951), but is more simple in form and fits better to the physical interpretation of the role of thermal excitation; (2) A phase rule for the surface pressure oscillations in purely gravitational tides is established to show that the surface maximum should occur at or up to half a period after the time of maximum tide-generating potential (e.g., the Lunar transit); (3) It is concluded that, in the solar semidiurnal tides, the thermal excitation is the very factor which causes the maximum surface pressure before the solar transit; (4) The order of magnitude of the semidiurnal component of the solar radiant energy received at the earth's surface is compared with that of the heat supply which is necessary to cause the observed order of magnitude of the amplitude and the phase angle of the surface pressure oscillation, the former being negligible compared with the latter. It is concluded that either other heat sources such as the turbulent heat conduction or the resonance mechanism should be taken into account. *Subject Heading:* 1. Atmospheric tides.—*Author's abstract.*

9.8-195

551.5471.

Jones, L., **Instruction technique sur le nivellement barométrique au Congo belge.** [Technical instructions for barometric leveling in Belgian Congo.] *Belgium. Académie Royale des Sciences Coloniales. Classe des Sciences Techniques, Mémoires*, n.s., 7(4), 1958. 73 p. 13 figs., 6 tables, 2 plates. **DLC**—The purpose of this publication is to explain barometric leveling as a method of surveying. It is based on two gravimetric expeditions in Belgian Congo from 1952 to 1956. During the first expedition the elevations of 6,550 stations over 750,000 km² were determined, during the second one those of 300 stations in the mountain regions of Graben in Central Africa. The main part of the publication deals with operational aspects. In an introductory chapter the principles of barometric leveling are summed up. Ch. 2 takes up instruments and their use and Ch. 3 discusses applications of barometric leveling. *Subject Headings:* 1. Altimetry 2. Barometric leveling 3. Belgian Congo.—*A. V.*

9.8-196

551.547.1

Podol'skiĭ, A. S., **K voprosu o barometricheskom nivelirovanii.** [Barometric leveling.] *Akademiia Nauk SSSR, Geofizicheskii Institut, Trudy*, No. 22(149):117-126, 1954. figs., tables, 3 refs., 5 eqs. **DLC**—The method of making more precise the results of barometric leveling and eliminating the systematic errors introduced by the natural climates and regional characteristics is based upon a complex calculation of the algebraic sums of these errors. This calculation is carried out with the aid of a graph of error-corrections relating the total error of barometric leveling of the difference between the heights of the determined stations and the stations whose heights are provisionally unknown and are calculated by the hypsometric formula. The graph is constructed for a given natural climatic region and season. An example of the application of this technique is presented. *Subject Headings: 1. Altimetry* **Barometric leveling.**—(Based on author's abstract).—*I.L.D.*

WIND AND TURBULENCE

See also: Wind direction bias, Canada (Potter), 9.8-98; Turbulent exchange (Slobodov), 9.8-162.

9.8-197

551.551:551.511.6

Lettau, Heinz, **Über den gegenwärtigen Stand des atmosphärischen Turbulenzproblems (Zusammenfassung).** [The present state of the atmospheric turbulence problem: summary.] *Germany. Deutscher Wetterdienst Berichte*, 4(22):9, 1956. **DWB, DLC**—The author discusses turbulence in a homogeneous atmospheric boundary layer, various micrometeorological processes associated with diurnal variations of radiation exchange at the surface of the earth, some applications of hydro-aerodynamic turbulence concepts, and turbulence problems of the free tropo- and stratosphere. *Subject Headings: 1. Atmospheric turbulence 2. Micrometeorological turbulence.*—*I.L.D.*

9.8-198

551.551:551.513.1

Ruzin, M. I., **Vliianie turbulentnogo treniia na dvizhenie vozdushnykh chastits.** [The influence of turbulent friction on the movement of air particles.] *Akademiia Nauk SSSR, Voprosy, Ser. Geofiz.*, No. 6:722-727, June 1956. 4 refs., 23 eqs. **DLC**—In connection with earlier studies on integrating the equations of movement of an ideal fluid for a rotating earth, the author investigated the effect of turbulent friction upon the movement of air particles. Equations showing the influence of turbulent friction upon wind velocity and for determining the trajectories of air particles are developed. *Subject Headings: 1. Turbulent flow of air 2. Turbulence theory 3. Equations of motion.*—*I.L.D.*

9.8-199

551.551:628.53

*Stewart, N. G.; Gale, H. J. and Crooks, R. N., **The atmospheric diffusion of gases discharged from the chimney of the Harwell pile (BEPO).** *Harwell, England. Atomic Energy Research Establishment, HP/R*, No. 1452, 1954. 40 p. 23 figs., 10 tables, 21 refs., 11 eqs. **DWB.** Review in *Royal Meteorological Society, Quarterly Journal*, 84 (359):85, Jan. 1958.—In order to determine the concentration of pollution downwind from a stack, actual readings of A^{41} concentration, allowing for radioactive decay with a mobile barrage balloon up to 10 m downwind and to heights of 200 m and the results tabulated and plotted in many ways (cross sections, scatter diagrams, etc.) for both inversion and steep lapse rate conditions. It was found that both the BOSANQUET and the SUTTON formulas give concentrations that are not in keeping with observed values especially at high wind speeds, and that the results do not permit solution by any mathematical formula. However, estimates of ground level concentration can be made from data which takes into consideration the conditions of emission from the stack as well as turbulence and lapse rate. Under inversion conditions, there was found to be no maximum area of concentration even at 10 km distance. *Subject Headings: 1. Stack meteorology 2. Radioactive argon (A^{41}) tracers 3. Harwell, Eng.*—*M.R.*

9.8-200

551.551:621.396.9

Stone, Melvin L. and Fleisher, Aaron, **The measurement of weather noise.** Massachusetts Institute of Technology. Dept. of Meteorology. Weather Radar Research. Contract

DA-36-039-Sc-71136, Project DA-3-99-07-022, Research Report, No. 26, May, 1956. 39 p. 13 figs., 13 refs., 17 eqs.—A detailed technical report on the analysis of gust data inherent in weather radar return fluctuations, and problems connected with circuits and analog correlator apparatus designed to automatically code, store, integrate and analyze such data, after eliminating any other type of "noise." It is pointed out that gust noise is difficult to differentiate from ordinary precipitation noise. *Subject Headings:* 1. Radar weather noise analysis 2. Radar gust observation 3. Analog correlators.—*M.R.*

WIND VARIATIONS AND SPECIAL WINDS

See also: Wind effects on sugarcane, India (Venkiteshwaran, Srinivasan), 9.8-73; Monsoon data forecasting, Far East (Ueki), 9.8-133; Precip. periodicities, Hungary (Péczeley), 9.8-225.

9.8-201

551.553:551.555.3(433)

*Obenland, Eugen, *Untersuchung zur Föhnstatistik des Oberallgäus*. [Investigations on föhn statistics in Oberallgäu.] Germany. *Deutscher Wetterdienst, Berichte*, 4(23), 1956. 40 p. 3 figs., 22 tables, 25 refs. DWB, DLC—This investigation aimed to obtain reliable statistics on föhn frequency in the Oberallgäu and to determine the relation of föhn incidence to large scale weather situations. Föhn statistics for the interval 1937-1952 were obtained by analyzing wind temperature and humidity observations recorded at Oberstdorf and data are given on the percent frequency of different temperatures, relative humidity jumps and on peak gusts during föhn occurrence at Oberstdorf, the annual and daily variations of föhn incidence, including data on the probability of föhn occurrence in individual hours of the day; the relationship between föhn occurrence and weather situations, the relationships between föhn and aerological conditions, the relationship between föhn at Oberstdorf and wind direction and force on the Zugspitze; and relative humidity on the Zugspitze; the temperature gradient Oberstdorf-Nebelhorn during föhn. In the period 1951-1954, föhn occurrence associated with föhn aloft is analyzed, and data are presented on the mean number of days with föhn and föhn hours associated with föhn aloft, percent of time, of total duration of cyclonic föhn processes with valley föhn; and the effect of large scale weather situations on föhn incidence in the light of föhn aloft, etc. *Subject Headings:* 1. Föhn statistics 2. Algäu, Bavaria.—*I.L.D.*

WIND EFFECTS

See also: Windbreaks and frost protection (Daigo, Maruyama), 9.8-79.

9.8-202

551.556.2:631.4

Egerszegi, Sándor, *Mezővédő erdősáv talajvédelmi szerepe a vízerózió leküzdésében*. [Soil protection from water erosion by means of shelter belts.] *Időjárás*, Budapest, 55(1/2): 14-30, Jan./Feb. 1951. 35 refs. Discussion p. 26-30. German summary p. 58. DLC—The factors involved in soil erosion are discussed, namely; soil structure and composition, meteorological factors (rain intensity and duration, wind direction and velocity, capillary moistening, duration of snow melt, and depth of soil freezing), plant cover and methods of cultivation. On the basis of research made in Hungary or reported by foreign authors (especially in the U.S.S.R.), evidence is given of the direct and indirect beneficial effects of shelter belts, such as reduction of erosion, conservation of rainwater and snow, reduction of wind, creation of a favorable microclimate in respect of temperature and humidity and, as a further consequence, prevention of drought, accumulation of fertile soil, and raising of the ground water level. In the discussion, Hungarian soil and agronomy experts state details of their experience and views on problems of prevention of soil erosion. *Subject Headings:* 1. Shelter belts 2. Soil erosion.—*G.T.*

9.8-203

551.556.4:551.311:631.4

Presniakova, G., *Mezhduvedomstvennoe soveshchanie po bor'be s eroziiei pochv*. [Interdepartmental conference on soil erosion control.] *Pochvovedenie*, No. 4:99-102, April 1956. DLC—An international conference on soil erosion was held in Moscow Dec. 12-16, 1955 under the auspices of the Soil Institute of the Academy of Sciences of the U.S.S.R. and the Ministry

of Agriculture. In this summary of the conference, various papers deal with wind and water erosion of soils and measures of controlling erosion. *Subject Heading: 1. Soil erosion.—I.L.D.*

9.8-204

551.556.4:551.311.3

Presniakova, G. A., "Chernye zimy" v Kamennoi stepi. ["Black winters" in the Kamennaya Steppe.] *Pochvovedenie*, Moscow, No. 1:102-108, Jan. 1956. 4 photos, table, 24 refs. French summary in supplement, *Pedologie*, No. 1:7, 1956. **DLC**—"Black winters" are the results of winter wind erosion and occur in steppe regions with slight snowfall, especially after a dry fall when the snow covers a frozen and dry soil. A detailed description of the origin and characteristics of black winters (illustrated with photographs), based on reports from various observers, is presented. Measures developed in the Soviet Union against this type of erosion and which consist largely of building field barriers for snow retention, etc. are given. Data are given on the effect of heaped up soil upon soil moisture reserves. *Subject Headings: 1. Wind erosion 2. Kamennaya Steppe, U.S.S.R.—I.L.D.*

9.8-205

551.556.2

*Tamate, Sankiji; Sato, Tadashi; Kashiya, Tokuji and Takahashi, Kikumatsu, **Experiment on model windbreak, Pt. 3, Effect on salty wind, Pt. 2.** Tokyo. *Forest Experiment Station, Bulletin*, No. 100:55-82, June 1957. 10 figs., 14 tables. In Japanese; English resume p. 80-82. Legends in Japanese and English. **DWB**—A long report on results of experiments conducted in Feb. 1950 and 1951 during N.W. monsoon in Yamagata Prefecture, on the relation between the "capturing function" of model windbreaks (2 to 15 m deep) for salt in a sea breeze, and the width of the windbreak, and on the influence of natural windbreaks on the salt content of the beach soil. The windbreaks were of Jack Pine about 120 m wide. A great amount of salt was found up to 70-80 m into the windbreak. *Subject Headings: 1. Windbreak effects on sea salt 2. Yamagata Prefecture, Japan.—M.R.*

UPPER AIR WINDS AND VERTICAL MOTION

See also: **Meridional cross sections** (Genève, Jacquemard), 9.8-166; **Jet stream structure** (Portugal), 9.8-167.

9.8-206

551.557:551.510.535

Royal Astronomical Society, **Geophysical discussion on winds in the upper atmosphere.** Observatory, London, 76(890):17-21, Feb. 1956. **DLC**—Discussion concerning winds in ionosphere, meteor trails and ionization, F-layer wind speeds and gradients, etc. *Subject Headings: 1. Ionospheric winds 2. Meteor ionization.—M.R.*

9.8-207

551.557:551.510.535:621.396

Rumsey, N. J. (*Dominion Physical Lab., Lower Hutt, New Zealand*), **Curvature-induced error in the analysis of fading records.** *Journal of Atmospheric and Terrestrial Physics*, London, 11(3/4):255-258, 1957. 2 figs., 10 refs., eqs. **DLC**—Curvature of lines of maximum amplitude in a radio field-strength pattern drifting across an array of three receivers can introduce an error into the estimate of the drift velocity, but the error is expected to be large only infrequently. The mean error is smaller for an array of receivers at the corners of an equilateral triangle than for one at the corners of a right-angled triangle. *Subject Heading: 1. Ionospheric drift measurement.—Author's abstract.*

9.8-208

551.558:629.135

Vul'fon, N. I., **Metod izucheniia kompensatsionnykh niskhodiashchikh techenii okolo razvivaiushchikhsia kuchevykh oblakov.** [Method for studying downward compensation currents near developing cumulus clouds.] *Akademiiia Nauk SSSR, Doklady*, 112(4):626-627, Feb. 1957. 2 figs., 3 refs. **DLC**. English translation available Associated Technical Services, P. O. Box 271, East Orange, N. J. as its ATS-67K20R.—Oscillograms of air temperature, load and speed of aircraft as well as deviations from a given height are used in order to study vertical air currents. Compensation currents were observed in narrow zones near the top of the cumuli. *Subject Headings: 1. Vertical currents 2. Cumulus clouds.—A.A.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY

See: **Hydrometeor obs.** (Pushkarev), 9.8-3; **Precipitable water data** (Martin), 9.8-18;
Dew point-relative humidity relationships (Cădéz), 9.8-97.

EVAPORATION AND EVAPOTRANSPIRATION

See: **Water balance of swamps** (Romanov), 9.8-235.

CONDENSATION

See also: **Icing of aircraft** (Perkins), 9.8-60; **Icing of transmission lines, Hungary** (Dömök), 9.8-87; **Cloud chambers** (Gunn, Phillips), 9.8-116; **Dew forecasting** (Davis), 9.8-141; **Cloud seeding with water** (Palomares-Casado), 9.8-146; **Thundercloud electrification** (Muchnik), 9.8-280.

9.8-209

551.574.1:551.576

Braham, Roscoe R., Jr. (*Univ. of Chicago*), **The physics of precipitation in cumulus clouds.** *Geofisica Pura e Applicata*, Milan, 35:126-138, Sept./Dec. 1956. 6 figs., 5 tables, 13 refs. **DLC**—Over the past several years the Univ. of Chicago has conducted a program of research into the physics and chemistry of cumulus cloud precipitation. From these measurements it has been possible to isolate the sublimation-coalescence mechanism (Bergeron process) from the condensation-coalescence mechanism and to estimate the relative role of each process in the formation of rain in cumulus clouds. It is found that size of cloud capable of raining is a strong function of geography, that the environment of the cloud is very important in determining the probability of rain and that liquid water content is one of the most important within-cloud parameters. An essential part of the research concerned cloud treatment. Definite, positive treatment effects were demonstrated for rain initiation through coalescence using water spray. No effects were detectable from dry ice seeding of subcooled clouds, although any such effects may have been obscured by sample size (27 cloud pairs). *Subject Headings*: 1. Cloud physics 2. Cumulus cloud precipitation 3. Sublimation-coalescence mechanism 4. Condensation-coalescence mechanism.—*Author's abstract.*

9.8-210

551.574.1

Mason, B. J., **Bursting of air bubbles at the surface of sea water.** *Nature*, London, 174(4427):470-471, Sept. 4, 1954. 3 refs. **DWB**—Mean diameter of drops projected vertically from bursting bubbles was 15% of that of parent bubble (0.3-4.3 mm). Also one or two droplets of diameter 5-30 μ are projected at a low angle and numerous (100-200) nuclei of salt content 10^{-16} to 2×10^{-14} gm (found in cloud chamber) are produced. It is suggested that disintegration of foam patches is the main source of salt nuclei. *Subject Heading*: 1. Saline nuclei.—*C.E.P.B.*

9.8-211

551.574.1

Mukherjee, A. K. (*Met. Office, Poona*), **Theoretical considerations on the Melander effect.** *Indian Journal of Meteorology and Geophysics*, Delhi, 8(4):435-438, Oct. 1957. table, 7 refs. **DWB, DLC**—Melander effect has been critically examined from the theoretical point of view. Heats of vaporization of sodium chloride from its solutions as ions, have been calculated. The values obtained are too high to favour any appreciable escape of NaCl from the solution into the air. *Subject Headings*: 1. Melander effect 2. Saline nuclei.—*Author's abstract.*

9.8-212

551.574.1:061

Nikandrova, G. T. and Smirnov, S. A., **Mezhvedomstvennaia konferentsiia po voprosam issledovaniia oblakov, osadkov i grozovogo elektrichestva.** [Intradepartmental conference on the problems of cloud, precipitation and thunderstorm electricity investigations.] *Me-*

teorologiya i Gidrologiya, No. 5:64-66, May 1956. DWB, DLC—An account of the proceedings of a conference on problems of investigation of clouds, precipitation and thunderstorm electricity held at the A. I. Voeikov Central Geophysical Observatory, Feb. 6-11, 1956. The papers delivered dealt with microphysics of clouds, aerological and synoptic investigations, thunderstorm electricity, methods of meteorological research. Brief summaries of some of the papers are given. *Subject Heading: 1. Cloud physics conferences.—I.L.D.*

9.8-213

551.574.1:551.575.1

Okita, T. (*Geoph. Inst., Asahikawa Branch, Hokkaido Gakugei Univ.*), **Size distribution of large haze particles.** *Meteorological Society of Japan, Tokyo, Journal*, Ser. 2, 33(6):291-295, Dec. 1955. 4 figs., 2 tables, 5 refs., 2 eqs. DWB, DLC—During the period from Feb. 17 to April 10 in 1955 the observations of large haze particles were made at several stations in Asahikawa. The results of observations are as follows: (1) The size distribution of particles in the air is expressed by the formulae $dN/dr = \text{const. } r^{-3.6}$ for $0.5 < r < 10\mu$, $dN/dr = \text{const. } r^{-4.7}$ for $10 < r < 40\mu$ and $dN/dr = \text{const. } r^{-7.5}$ for $r > 40\mu$, where r is the radii of the particles; (2) The mean density of non-hygroscopic and the ratio of the concentration of non-hygroscopic particles to that of hygroscopic particles increases with particle size. *Subject Headings: 1. Haze particle size distribution 2. Damp haze 3. Hygroscopic nuclei 4. Non-hygroscopic nuclei 5. Asahikawa, Japan.—Author's abstract.*

9.8-214

551.574.1

Sagalyn, Rita C. and Faucher, Gerard A. (*Geophys. Res. Dir., Cambridge Res. Center, Mass.*), **Time variations of charged atmospheric nuclei.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, *Proceedings*, pub. N. Y., Pergamon Press, 1957. p. 97-121. 13 figs., 2 tables, 13 refs., eqs.) DLC (QC921.5.U5), DWB—An investigation of time variations in the vertical and horizontal distribution of charged atmospheric nuclei in fair weather has been carried out by means of aircraft. In the exchange layer, regular variations of nucleus concentration with time are observed from the vicinity of sunrise to early afternoon. Analysis of the meteorological data obtained simultaneously shows that this variation is caused primarily by the action of the daily turbulent cycle. During periods of low advection, regular variations of nucleus concentration with time are also observed in this region from early afternoon to the following sunrise, and are shown to be the result of coagulation and subsidence. The time variations at night are more complicated during periods of intense advection. Above the exchange layer, variations in nucleus content with time are not found to be regular. The effect of these daily variations in nucleus content on the electrical properties of the atmosphere is shown. An analysis of observed daily variations in the magnitude of the horizontal fluctuations of nucleus density is also given. *Subject Headings: 1. Nuclei diurnal variations 2. Charged nuclei.—Authors' abstract.*

9.8-215

551.574.1:551.508.91

Sano, I. and Fukuta, N. (*Chemical Inst., Faculty of Science, Nagoya Univ.*), **Observations of the ice-nucleating temperature of some chemical substances.** *Meteorological Society of Japan, Tokyo, Journal*, Ser. 2, 34(5):293-295, Oct. 1956. 2 figs., 8 refs. English summary p. 293. DWB, DLC—In order to get a clue to the relation among the ice-nucleating activity of substances and their crystal structure, solubility and other properties, a thermostat-like cold-chamber functioning at any temperature higher than -20°C has been constructed and about 30 materials—oxides of cobalt, nickel, cadmium, magnesium and zinc, halides of alkali and alkaline earth metals and of silver, lead, cadmium sulfide, magnesium telluride, etc. belonging to either the cubic or hexagonal system have been examined as to the temperature of ice crystal formation. The main findings are as follows: 1) The more closely the lattice constant approximates that of ice, and the more definite the insolubleness in water, the more likely the substances, both cubic and hexagonal, are to exhibit marked ice-forming property; 2) Lead iodide and silver iodide are the most effective of the substances examined, the ice crystals being found to form from supercooled clouds at -2.3° and -2.9°C , respectively, in the presence of these foreign nuclei. *Subject Headings: 1. Nuclei effectiveness 2. Cloud chamber studies of nuclei.—Authors' abstract.*

9.8-216

551.574.1

Schaefer, Vincent J. (*Munitalp Foundation, Inc.*), **The question of meteoritic dust in the atmosphere.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, *Proceedings.* pub. N. Y., Pergamon Press, 1957. p. 18-23, 4 refs.) **DLC** (QC921.5.U5), **DWB**—Attempts to collect meteoritic dust from melted snow and warm frontal rain samples by the magnet method showed that, although samples are obtainable wherever the method is tried, analysis and observation indicate that most of the residues gathered are of terrestrial origin. Experiments directed towards testing the magnet gathered dust for ice nucleating properties resulted in negative results at -25°C . A further attempt to form ice nuclei by vaporizing bits of an iron-nickel-cobalt meteorite also produced negative results at -25°C . **Subject Heading:** 1. Meteoric dust effects on rainfall.—*Author's abstract.*

9.8-217

551.574.1

Schotland, R. M. (*N. Y. Univ., N. Y.*), **The collision efficiency of cloud droplets.** (In: Conference on the Physics of Cloud and Precipitation Particles, Sept. 1955, *Proceedings.* pub. N. Y., Pergamon Press, 1957. p. 170-176. 6 figs., 2 refs., eqs.) **DLC** (QC 921.5.U5), **DWB**—An experimental determination by a modeling technique has been made of the collision efficiencies of water cloud drops. Collision efficiency curves are presented for simulated 11, 14, 17 and 21 μ diameter cloud drops with respect to a range of smaller cloud drops. **Subject Heading:** 1. Droplet collision efficiency.—*Author's abstract.*

FOG

See also: **Advection fog forecasting, Leningrad, U.S.S.R.** (Dranevich), 9.8-136; **Objective fog forecasting, Dum Dum Airport, India** (Majumdar), 9.8-137; **Smog, Milan** (Scicchitano), 9.8-153; **Haze particle size distribution, Japan** (Okita), 9.8-213.

9.8-218

551.575.1:628.8

Robertson, George W., **Low-temperature fog at the Edmonton Airport as influenced by moisture from the combustion of natural gas.** *Royal Meteorological Society, Quarterly Journal*, 81(348):190-197, April 1955. 6 figs., 6 tables, 2 refs., 2 eqs. **DWB**—Edmonton airport is $2\frac{1}{2}$ mi N.W. of the City center. The main fuel in Edmonton is natural gas. Visibility is usually below $\frac{1}{2}$ mi at Edmonton, but not at the rural district of Vermilion, at temperatures below -40°F . The poor visibility occurs mostly with light winds from S. or S.W. in polar or arctic air; the maximum frequency is at $8\frac{1}{2}$ - $9\frac{1}{2}$ h when heaters are turned up. The amount of gas burnt, and the consequent production of water vapor, are calculated, and it is shown that a south wind of 2-3 mi/hr at -25°F , initially at a humidity of 80-85%, will be saturated by the time it reaches the airport. **Subject Headings:** 1. Ice fog 2. Artificial fog 3. Edmonton, Canada.—*C.E.P.B.*

CLOUDS

See: **Cirrus forecasting, British Isles** (James), 9.8-142; **Contrail forecasting** (Osterle), 9.8-143; **Effective radiation, Belgian Congo** (De Coster, Scheüpp), 9.8-182; **Cumulus cloud precip.** (Braham), 9.8-209.

PRECIPITATION

See also: **Drought and artificial rainfall, Mexico** (Noble, Lebrija), 9.8-16; **Animal climatology, Brazil** (Mota), 9.8-74; **Forest influences** (Tanaka), 9.8-82; **Radar rainfall meas.** (Hiser et al.), 9.8-103; **Radar precip. meas.** (Semonin), 9.8-106; **Climate of South Africa**, 9.8-109; **Precip. forecasting, Alps** (Courvoisier), 9.8-134; special bibliography on **Radar Meteorology**, p. 1005.

9.8-219

551.577:633.73(673)

Pessanha, Martim, **Contribuição para o estudo da relação entre a chuva e a produção da *Coffea Canephora Pierre*.** [Contribution to the study of the relation between precipitation and the productivity of *Coffea Canephora Pierre*.] *Agronomia Angolana*, Luanda, No. 10:9-15.

956. table, graph, 5 refs. French and English summaries p. 13. DWB, DLC—Correlation between rainfall and coffee productivity (amount of fresh coffee beans harvested) at Cazengo, Angola (Central Agricultural Station) for 1947–1955, shown graphically, gives some indication of a relationship between rainfall of previous years and average production. No tests of significance are produced. *Subject Headings:* 1. Rainfall effects on coffee production 2. Coffee production 3. Cazengo, Angola.—M.R.

9.8–220

634.94:551.577(43)

Schulz, Heinz, *Erfahrungen mit der Jahrring-Analyse zur Erkenntnis hydrologischer Verhältnisse vergangener Jahrhunderte*. [Experience in tree ring analysis for information on hydrological conditions of past centuries.] *Deutsche Gewässerkundliche Mitteilungen*, Coblenz, (4/5):82–83, Oct. 1957. figs. DWB—The age of oak trees found in the Elbe river bed was determined at 555 ± 90 , 1930 ± 100 and 2000 ± 60 yrs. (C_{22} dating). No correlation could be established between tree ring widths of younger trees near the Elbe and available precipitation data. This is attributed to the fact that in an area of sufficient moisture (like the one investigated) the factor influencing tree growth variations is temperature rather than moisture supply. *Subject Headings:* 1. Radiocarbon dating 2. Tree ring analysis 3. Elbe River Basin, Germany.—G.T.

9.8–221

551.577:551.501.7

Sinha, K. L., *Estimation of the momentum of the falling rain by gas filled balloon*. *American Meteorological Society, Bulletin*, 38(7):433–434, Sept. 1957. 4 eqs. DWB—The momentum imparted to a small balloon by falling rain is estimated and found to be almost negligible except for very heavy rains. For large balloons the reduction in free lift is small but enough to allow calculation of the momentum from changes in rate of ascent. If the intensity of the rainfall is known, the velocity of the falling drops can be thus calculated. Turbulence is, however, a much greater factor in changes in rate of ascent. *Subject Headings:* 1. Raindrop velocity 2. Rainfall effects on balloon ascension 3. Balloon ascension rates.—M.R.

9.8–222

551.577:631.4

Smith, R. M.; Henderson, R. C. and Tippit, O. J. (all, *Blackland Experiment Station, Temple, Texas*), *Summary of soil and water conservation research from the Blackland Experiment Station, Temple, Texas, 1942–1953*. *Texas. Agricultural Experiment Station, Bulletin*, No. 781, June 1954. 54 p. 52 figs., 18 tables, 33 refs. DWB (631.45 S657s)—Annual precipitation 1913–53 from Blackland Experiment Station, Temple, Tex. is shown in series of histograms; average (1942–51) rainfall vs. erosion, soil losses and runoff, and storm hydrographs for a 2.0" rainfall in May 12, 1953, showing relation to soil moisture and crop conditions, slopes, and for an additional storm rainfall of 1.66" immediately following the 2.0" storm are also shown (on curves). All data are given in appendix. Details of lysimeter design and operation and other crop-runoff-erosion studies are presented. *Subject Headings:* 1. Soil conservation research 2. Rainfall-runoff relationships 3. Lysimeters 4. Temple, Texas.—M.R.

9.8–223

551.577.1:551.509.324.2

Deij, L. J. L. (*Netherlands Met. Inst.*), *Algemene beschouwingen over de neerslag*. [General review of precipitation.] (In: *Nederlandse Centrale Organisatie voor Toegepast-natuurwetenschappelijk Onderzoek. Commissie voor Hydrologisch Onderzoek, Verslagen technische bijeenkomsten 7–10 en Verslag inzake het verdampingsonderzoek in de Rottegatpolder 1947–1952*; pub. 's-Gravenhage, 1955. p. 13–19. English summary p. 260; French summary p. 282. DWB—The author presents a general and brief discussion of the importance of precipitation data in practical and theoretical hydrology, the synoptic meteorological and statistical climatological methods for determining amount and occurrence of precipitation, the physics of rainfall formation, the predictions of artificial rainfall, and the meteorological and climatological aspects of rainfall formation and incidence. *Subject Headings:* 1. Precipitation 2. Rain formation 3. Cloud seeding.—I.L.D.

9.8-224

551.577.11:551.51

Peterson, Kendall R. (*Hydromet. Sec., U. S. W. B., Washington, D. C.*), **Precipitation rate as a function of horizontal divergence.** *Monthly Weather Review*, Wash., D. C., 85(1):9-10, Jan. 1957. 3 figs., 5 refs. DWB, DLC—Two nomograms show rates of precipitation for pseudoadiabatically ascending air, assuming 1) constant convergence and 2) linear decrease of convergence with height for temperatures from 35° to 75°F, and convergences of 2 to $20 \times 10^{-4} \text{ sec}^{-1}$. These show that precipitation rate increases with both increasing surface temperature and increasing convergence, and that it depends largely on surface convergences, and not so much on vertical distribution of divergence. Hence, a linear decrease with height seems reasonable. Histograms of precipitation rate (inches per 6 hours) for 1 km layers for a surface convergence of 10^{-4} sec^{-1} and a surface temperature of 60°F for a) constant convergence with height and b) linear decrease of convergence with height are presented. These show that the greatest 1 km contribution to the total rainfall rate occurs at 3 to 5 km for constant convergence and at 2-3 km for a linear decrease of convergence. *Subject Headings:* 1. Precipitation mechanism 2. Precipitation forecasting.—M.R.

9.8-225

551.577.33(439.1):551.555.1

Péczezy, György, **A passzáttrendszer hatása Magyarország csapadékjáráásában.** [Effect of the trade wind system on precipitation in Hungary.] *Időjárás*, Budapest, 55(9/10):274-277, Sept./Oct. 1951. 2 figs. Russian and French summaries p. 310-311. DLC—In addition to the annual precipitation periodicity, a secondary semi-annual periodicity is found in the rainfall records of 25 stations in Hungary (1871-1930). This periodicity is similar to that found in the Mediterranean region (trade wind influence). The theory that the semi-annual periodicity is due to trade wind influence is confirmed by the decrease of its amplitude toward the north. *Subject Headings:* 1. Trade wind influences 2. Precipitation periodicities 3. Hungary.—G.T.

9.8-226

551.577.36

*Perrin de Brichambaut, C., **Notes sur les pluies en A.E.F.** [Notes on precipitation in French Equatorial Africa.] *La Météorologie*, Paris, Ser. 4, No. 43:215-241, July/Sept. 1956. 8+ figs., 6+ tables, 17 refs. French, English and Spanish summaries p. 215. DWB—The available rainfall records for Brazzaville, Pointe-Noire, Fort-Lamy, Fort Archambault, Libreville, Port Gentil and Bangui in French Equatorial Africa are analyzed to show the duration frequencies of intense rainfall. Annual rainfall (various parameters) for 32 stations in A.E.F. are tabulated and shown by isohyetal charts and monthly values by means of charts and complex histograms. The mechanism of intertropical rain, duration of dry and wet seasons, 24 hour rainfall, variability, inter-station correlation average Basin rainfalls, etc. are treated. *Subject Headings:* 1. Intertropical rainfall 2. Rainfall depth duration frequencies 3. French Equatorial Africa.—M.R.

9.8-227

551.577.38(73)

Palmer, Wayne C. and Seamon, Lilburn H. (*both, Office of Climatology, U. S. W. B.*), **Drought in 1956.** *Weatherwise*, Boston, 10(1):22-25, Feb. 1957. 5 figs. DWB, DLC—Drought is defined as a climatic anomaly or temporary departure of climate from the normal toward aridity. The 1956 drought in the S. Central and S.W. part of the United States was one of the severest in centuries. Precipitation was <50% in some places (Texas Panhandle), <25% of normal (Oklahoma and adjacent New Mexico and Kansas) in others. Water supply was lowest on record in some places. Damage ran into billions. *Subject Headings:* 1. Drought, U. S. (1956) 2. Southwestern United States.—M.R.

9.8-228

551.577.38(78)

President's Conference on Drought, Wichita, Kansas, Jan. 14-16, 1957, [Papers]. Various pagings. Mimeo., typescript, etc. DWB (M72 P928br)—This is a compilation of reports containing condensed data focusing the agricultural-hydrological-meteorological situations of Arizona, Montana, Nebraska, New Mexico, North Dakota, Kansas and Oklahoma. In addition to other information included, so as to enlighten and arouse attention for various drought counter measures requiring federal aid, the material served the purpose of "Press Release." *Subject Headings:* 1. Drought, U. S. (1957) 2. Midwestern United States.—W.N.

9.8-229

551.577.38:631.67(57)

*Protserov, A. V., *Kharakteristika zasushlivosti vegetatsionnogo perioda sel'skokhoziaistvennykh kul'tur na territorii orosheniia Kuibyshevskogo gidrouzla*. [Drought characteristics of the vegetation season of agricultural crops in the irrigated region of the Kuibyshev hydroelectric network.] Moscow. Tsentral'nyi Institut Prognozov, Trudy, 29(56):5-59, 1953. 8 figs., 66 tables, 8 refs. DLC—In this study of the effect of drought upon agricultural crops, the author does not use the calendar year as the time interval but rather natural phases of plant growth and development. The procedure of analysis, which involves the establishment of agricultural periods and characterization of the growth conditions of agricultural crops on the basis of precipitation and temperature, is described. The characteristics of the agricultural periods are described with the aid of numerous tables and graphs; these include the characteristics of winter, period of snow melt, period of "sowing-earring" of summer wheat, period of "earring-waxy ripeness" of summer wheat, the total growth period of summer wheat, period of growth of winter wheat and the period of fall accumulation of moisture supply. This is followed by an analysis of the agrometeorological conditions for growth of summer wheat and the norms of irrigation. *Subject Headings*: 1. Irrigation 2. Drought effects 3. Kuibyshev, U.S.S.R.—I.L.D.

RAIN, SNOW AND HAIL

See also: Watershed precip.-runoff data, N. Carolina (Johnson, Dils), 9.8-7.

9.8-230

551.578.11

Telford, J. W. and Thorndike, N. S. (both, Div. of Radiophysics, C.S.I.R.O., Sydney, Australia), *The coalescence between water drops*. Puy de Dôme. Observatoire, Bulletin, Ser. 2, No. 1:1-3, Jan./March 1956. 3 figs., 2 refs. DWB—Additional data are presented as a reply to DESSENS' (1955) review of the author's (1955) paper in *Royal Met. Soc., Quarterly Journal* regarding coalescence of droplets. Small drops of 100-200 μ are supported in a vertical air stream so drops travel slowly upward unless coalescence occurs, when they begin falling. Paths are shown in a microphotograph. Collection efficiency did not vary with drop size from 100-200 μ but future tests with smaller drops probably will show some decrease with decreasing drop size. Non-turbulent flow is necessary and hence boundary areas must be avoided. *Subject Headings*: 1. Coalescence of drops. I. Dessens, H.—M.R.

9.8-231

551.578.46

Ōnuma, Masayuki (*Branch ST. Snowy Dist. of Agriculture, Yamagata*), *Forms of deposited snow on mountains*. Researches on Snow and Ice, Tokyo, No. 2:129-138, Jan. 1955. 12 figs., table, 18 refs. In Japanese. DWB—Altitudinal (level) distribution of snow cover (deposited snow) at a linearly inclined plane appears as a concave curve (against the altitude in graph). The curvature is greater in the early snow cover-period and decreases with aging of snow cover. A concavely inclined plane results in a greater degree of concavity of the curvature (mentioned above) and a convexly inclined plane reduces the concavity of the curvature; it may result in a convex curvature in the extreme case. The curvature (mentioned above) increases on the wind side slope and, conversely, decreases on the lee side slope. Geographic snow-cover distribution depends on the difference of the winter precipitation. Vertical density distribution gradually changes from a constant density in the early snow-cover period to radially dispersed curvilinear groups in the later period. The density of the upper snow-cover layer increases from the end of snow-cover period to the beginning of the snow-melting period. Overall (layer) density distribution curve plotted against time, during snow-cover period and snow-melting period, appears as reversed S letter shape. The density in the snow-melting period increases linearly. *Subject Heading*: 1. Snow cover distribution on slopes. —J. Woo.

9.8-232

551.578.7:632.134

Pellisari, L., *Difesa contro la grandine*. [Protection against hail.] *Rivista di Meteorologia Aeronautica*, Rome, 17(2):67, April/June 1957. DLC—A new method of anti-hail action, using radioactive oxide to complement the present use of rockets. The new system allows

for protection of 250,000 ha of cultivated land in the Piedmont region. The material is disseminated from balloons during storms in clouds appearing to be hail producing. *Subject Headings*: 1. Radioactive oxide hail suppression 2. Hail protection 3. Piedmont, Italy —M.R.

HYDROMETEOROLOGY

See also: Watershed precip.-runoff data, N. Carolina (Johnson, Dils), 9.8-7; Fire weather (Robin), 9.8-81; Flood intensities, Danube (Schwarzl), 9.8-251.

9.8-233

551.579:631.67

*Dunin-Barkovskii, L. V., O vodnom balanse oroshaemoi territorii. [Water balance of irrigated land.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geograf.*, No. 5:61-73, Sept./Oct. 1956. 6 tables, 9 refs. **DLC**—The nature of the water balance over an irrigated area is examined with special reference to the various methods employed to determine inflow of water from rivers and the expenditures of the water. The actually measured use of irrigation water from the Syr Darya is compared with that calculated by the water balance method and the differences in accuracy are noted. Also, various methods used in the U. S. and other countries to calculate water balance during irrigation are discussed. Numerous data are presented. *Subject Headings*: 1. Hydrologic cycle 2. Irrigation 3. Syr Darya, U.S.S.R. —I.L.D.

9.8-234

551.579:551.573 (493)

*Poncelet, L., Sur de degré de régularité des ressources en eau météorique. [Degree of regularity of water supply from precipitation.] *Belgium. Institut Royal Météorologique Contributions*, No. 28, 1955. p. 239-253. 7 figs., 7 tables, 13 foot-refs., 2 eqs. **DWB**—Reprinted from *Belgium. Centre Belge d'Etude et de Documentation des Eaux*, No. 30:239-253, April (?), 1955.—The basic concepts of the hydrologic cycle and of the water balance in a river basin are reviewed, and the particular case of the basin of the Meuse analyzed on the basis of the data for 5 stations for 1911-1953 (a comparison for 100-150 stations for period 1928-54 with the 5 stations selected shows a variability of 14.4% vs. 14.0%, respectively). The monthly, seasonal and annual variability as a function of area and of duration of record losses by evapotranspiration and variability thereof, and comparison of precipitation with runoff for the entire period of record are presented. Finally, characteristics of the runoff during years of extreme drought, and possibilities of employing artificial methods to induce precipitation, are analyzed and discussed. *Subject Headings*: 1. Hydrologic cycle 2. Precipitation-runoff relationships 3. Hydrologic data 4. Meuse Basin, Belgium.—M.R.

9.8-235

551.579:551.501.4:551.573

Romanov, V. V., Gidrofizicheskie metody rascheta vodnogo balansa bolot. [A hydrodynamic method for calculating the water balance of swamps.] *Pochvovedenie*, Moscow, No. 8:49-56, Aug. 1956. 5 tables, eqs. **DLC**—In order to investigate the hydrology of swamps by avoiding the use of long period hydrometeorological observations, the author suggests the investigation of evaporation from the surface of swamps. Evaporation is studied by analyzing the heat balance of selected swamps in White Russian Polesie and in Esthonia during the period 1951-1953. Evaporation was calculated by the formula $U = \alpha R + C$, where U = evaporation in mm/hr; R = radiational balance of an active surface in cal/hr/cm²; α = constant; C = flow from a given part of the swamp. It was found that evaporation is directly proportional to the radiation balance and that the coefficient of proportionality depends upon moisture supply of the evaporating region and upon the developmental stage of the plants. The result of calculations of water balance for Oligotrophic swamps, evaporation from dry swamps, monthly evaporation from swamps and from swamps under field crop, etc. are presented. The application of the values of evaporation and water balance to extensive swamp areas is discussed. A formula for expressing penetration through turf is presented. *Subject Headings*: 1. Water balance of swamps 2. Evaporation calculations 3. Hydrologic cycle.—I.L.D.

9.8-236

551.579.4

Rowe, R. Robinson; Long, Gordon L. and Royce, Thomas C., **Flood frequency by regional synthesis.** *American Geophysical Union, Transactions*, 38(6):879-884, Dec. 1957. 6 figs., 2 tables, 2 refs. **DWB, DLC**—Design of highway bridges in California has been predicated on waterways required for 30-yr to 100-yr floods. Determination of such floods is highly speculative because of relatively short stream-flow records. Longer records for an average stream of hydrologically homogeneous region have been synthesized by combining nondimensional peak discharges, so as to derive factors for extrapolation of frequency curves for each stream in the region. Reliability of the method, depending upon definition of homogeneity of a region, was tested by a graphical comparison. The test was devised by hypothesizing a "perfect" 1000-yr flood record and dividing it by chance distribution into 20 50-yr records. Superimposed frequency graphs of these 20 hypothetical records gave a visual measure of disparities to be expected in natural records of comparable streams. The paper, illustrated by charts, briefs the development of the graphical test, describes the application to one region in California, and shows similar results in a second region of entirely different character. **Subject Heading: 1. Flood frequency calculation.—Authors' abstract.**

9.8-237

551.482:551.579.4(58)

Shul'ts, V. L., **Srednii stok rek Srednei Azii.** [Mean discharge of Central Asiatic rivers.] In: *Akademiia Nauk Uzbekskoi SSR. Institut Matematiki i Mekhaniki, Meteorologiya i gidrologiya v Uzbekistane.* Tashkent, 1955. p. 231-246. 9 figs., 2 tables, 7 refs., eqs. **DLC**—In 1954 in connection with the preparation of **Ukazanii k proizvodstvu raschetov srednogo stoka v usloviakh Srednei Azii** [Directions for computing the river discharge in Central Asia] the author, together with L. S. ABDURPAKHOV, corrected the map of mean annual flow on the basis of hydrological material which is three times as large as the material used for the 1941 map. The maps are based upon data for the period 1933-1952 and it is shown that deviation of the mean discharge for this period from the entire period of observations is slight. The author discusses the mean discharge and its dependence upon altitude, the map of the mean discharge of the rivers of Central Asia, and the precise determination of the mean flow of insufficiently studied catchment basins. Maps showing the mean annual discharge of the rivers of the Kashka-Darya, Kafirnigan and Zeravshan basins, of the Fergana depression, of the rivers of the Tatar and Chu basins, of the Angrena, Chirchik, Kedesa and Chirchik basins, the isolines of mean discharge of the Pamir rivers and of the mean annual discharge of the rivers of Central Asia are presented. Also numerical data giving the mean discharge module for an average height of a catchment basin are included. **Subject Headings: 1. River discharges 2. Central Asia.—I.L.D.**

9.8-238

551.579.4:627.51

Stiles, William W. (*Sch. of Pub. Health, Calif. U. at Berkeley*), **How a community met a disaster: Yuba City Flood, Dec. 1955.** *American Academy of Political and Social Science, Annals*, 309:160-169, Jan. 1957. 2 tables. **DWB**—The Yuba City flood of Dec. 23-30, 1955, was the worst disaster to hit California since the 1906 (San Francisco) earthquake, and the 6th greatest disaster in the U. S. since the founding of the Red Cross in 1881. Precipitation of 20-30 in. or more exceeded 78 yr record. A toll of 80 dead, 4,338 injured, 50,000 homes flooded and 4000 homes destroyed or wrecked, \$225 million property damage and topsoil eroded. Protective measures, evacuation, communications and warning, rescue work, resettlement, public health services, renewed threat in Jan. when the river rose to within 12 in. of the top of the 69 ft emergency levee, losses, government aid and lessons learned are discussed. Serious floods have occurred in the Feather River in 1937, 1940, 1942, 1944, 1948 and 1950. **Subject Headings: 1. Flood disasters 2. Flood, Yuba City—(Dec. 1955) 3. Feather River, Calif.—M.R.**

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See: **Met. elements, Canadian Arctic**, 9.8-36; **Climatology conf., U.S.S.R.** (Pastukh), 9.8-42; **Agricultural climatology, Sobakino, U.S.S.R.** (Panina), 9.8-75; **Global circulation (Pokrovskaja)**, 9.8-165.

CLIMATE OF PARTICULAR PLACES

See also: **Maudheim Expedition, Antarctica, 1949-1952** (Schytt), 9.8-33; **Bibliog. on climate of Cuba** (Grimes), 9.8-49; **Climate of Canary Islands** (Ceballos et al.), 9.8-77; **Temp. meas. and clothing, Death Valley, Calif.** (Sissenwine et al.), 9.8-94; **Climate and erosion, French Guinea** (Pouquet), 9.8-100; **Climatic changes, U.S.S.R.** (Rubinshtein), 9.8-250.

9.8-239

551.582(263.9)

Parsons, James J., **San Andrés and Providencia: English-speaking islands in the western Caribbean. California. Univ. of California Publications in Geography**, 12(1):1-84, 1956. 5 plates, 3 maps, bibliog. p. 67-72. DWB (986.1 P268s)—This monograph on the colonization and on the political, social, cultural, economic, and physical geography of the English-speaking islands in the western Caribbean (San Andrés and Providencia at 12°N lat., 80°W long.) contains a section on the climate, giving the highlights of a 10-year record (1932-41) of rainfall and mention of hurricanes and droughts. Temperatures are estimated from the U. S. W. H. records at Swan Island (1941-50) 300 mi N.W. *Subject Headings*: 1. Climate of San Andrés Island 2. San Andrés Island.—M.R.

9.8-240

551.582(789)

Potter, Loren D. (*Dept. of Botany, North Dakota Agric. College, Fargo*), **Phytosociological study of San Augustin Plains, New Mexico. Ecological Monographs**, Durham, N. C., 27(2):113-136, April 1957. 11 photos, 11 tables, bibliog. p. 135-136. DLC—Climate of these Plains in West Central N. Mexico (6800-7000 ft elevation) with surrounding ranges 1000-3000 ft higher is briefly discussed on p. 115-118. Only one long period record is available (Horse Springs, 7070 ft elev.). Brief records from 3 other places are discussed. *Subject Headings*: 1. Climate of San Augustin Plains, N. Mex. 2. Ecoclimatology 3. San Augustin Plains, N. Mex.—M.R.

9.8-241

551.582(83)

*Schwabe, G. H., **Die ökologischen Jahreszeiten im Klima von Mininco (Chile).** [Ecological seasons in the climate of Mininco, Chile.] *Bonner Geographische Abhandlungen*, Bonn, No. 17:139-190, 1956. 14 figs., 8 tables, 20 refs. Spanish summary p. 189-190. DLC—The ecologically decisive characteristics of the climate of Chile lie in the discordance between radiation conditions which correspond to latitude and by the negative anomaly of atmospheric temperature caused by the Humboldt Current. The effects of their climatic discordance upon the ecological structure of the southern longitudinal valley are analyzed with reference to plant yield of open and agricultural areas. The study is based upon observations of air and soil temperature at different depths, of precipitation, sunshine duration and atmospheric humidity, carried out in Mininco during the period 1 June 1953-31 May 1954, and upon a comparison of the data with normal means. The vegetation year is found to consist of five critical periods determined by temperature and water conditions, namely: winter early spring crises, early summer, summer drought and later summer crises. The meteorological variables and the soil temperature (1 to 50 cm) are presented in tables and graphs and both microclimate as well as macroclimate are analyzed. *Subject Headings*: 1. Climate of Mininco, Chile 2. Mininco, Chile.—I.L.D.

9.8-242

551.582(83)

*Schwerdtfeger, W. (*Natl. Met. Service, Argentina*), **Determinación indirecta de las condiciones climáticas del hielo continental Patagónico.** [Indirect determination of climatic

conditions of the continental ice of Patagonia.] *Sociedad Científica Argentina, Anales*, 61(4/6):53-82, April/June 1956. 4 figs., 8 tables, 17 refs. English summary p. 53. **DLC**—The scanty available meteorological data for the vicinity of the Chilean (Patagonian) ice fields are analyzed and extrapolated to show the physics of the conditions which form these ice fields. Winds over the Cordillera during each of the 4 seasons at 45-50° and 50-55°S, a model of air currents to 10 km over the Cordillera, humidity, cloudiness, condensation level, temp. frequency at the foot of the mountain and on the Continental ice, difference between mean monthly temp. at the base and top of the range and in the free air, precip. at 14 points (up to 5000 mm/year) and seasonal regime, vertical movements of air and thermodynamic consequences, etc. are discussed with tabular and graphic analyses of data. It is estimated that annual precip. of ice fields should be 7000 mm or 275". *Subject Headings*. 1. Climate of Patagonian ice fields 2. Chilean Patagonia.—*M.R.*

9.8-243

551.582(87)(729):551.581(213)

Sinfontes, Ernesto, *Climas comparativos: Puerto España, Trinidad; Bolívar, Caracas (el mar, el llano, la cordillera)*. [Comparative climate of Puerto España, Trinidad; Bolívar, Caracas (with respect to the sea, the plains and the mountains).] Caracas, Imprenta Nacional, 1951. 23 p. photos, tables. At head of t-p: Meteorología tropical. **DWB** (M82.1/87 S573c)—A short discussion of each of the ordinary climatic elements: temperature, pressure, humidity, cloudiness, dew, precipitation, sunshine, wind, etc., with brief illustrative tables of data for Ciudad Bolívar, Caracas and Puerto España in Venezuela and Trinidad, respectively. The data are used to generalize for other mountain, plain (llanos) and seacoast climates of the tropics. Nice illustrations of the regions are included. *Subject Headings*: 1. Climate of tropical regions 2. Tropical climates 3. Venezuela 4. Trinidad.—*M.R.*

9.8-244

551.582(72)

†Stevens-Middleton, Rayfred Lionel, *La obra de Alexander von Humboldt en México: fundamento de la geografía moderna*. [Alexander von Humboldt's work in Mexico: founding of modern geography.] *Sociedad Mexicana de Geografía e Estadística, Boletín*, 81(2):March/April 1956. 269 p. maps (fold.), 148 refs. **DWB**—Among the various fields of study comprehended in the works of HUMBOLDT and covered in this monograph on Mexico, the climatological and meteorological essays are treated in Ch. 5 (p. 103-116). Most of these works deal with the effect of the climate of Spanish America on the vegetation (natural and cultivated) and on man. He took actual observations of pressure, wind and of water temperature on his voyage from Guayaquil to Acapulco. He also wrote on the trade and monsoon winds; land and sea, mountain and valley breezes. Many citations from his works are included in this regional discussion and in the treatment of the systematic aspects of climate (general circulation, micro- and bioclimatology, etc.). *Subject Headings*: 1. History of climatology 2. Climate of Mexico 3. Mexico.—*M.R.*

9.8-245

551.582.1(497)

*Papagianakis, S. D. (*Natl. Met. Service of Greece, Athens*), *The weather conditions of Balkan Peninsula during the winter 1940-1941*. *Geophysica*, Helsinki, 6(1):52-57, 1957. table, 6 refs. **DLC**—A study of cyclonic and anticyclonic "types," and composite isobaric types in N.W. Greece and S. Albania during the period Nov. 1940-April 1941 when the Greek troops suffered severely from cold air outbreaks, abundant rain and snow, and the like. Tens of thousands of soldiers were ill because of exposure during this unusually cold winter. Coldest weather was in Dec. and in March and April, but raw weather in Jan. and Feb. did as much harm to troops. Frequencies of the various types and sub-types are tabulated for each month from Nov. 1940-April 1941. *Subject Headings*: 1. Air mass climatology 2. Weather types 3. Severe winters 4. Greece.—*M.R.*

9.8-246

551.582.2(54) 551.585.53

Pramanik, S. K.: Hariharah, P. S. and Ghose, S. K. (*all, Indian Met. Dept., Poona*), *Analysis of the climate of the Rajasthan Desert and its extension*. (In: International Symposium on Desert Research, Jerusalem, May 7-14, 1952, *Proceedings*, p. 176-184, pub. 1953. 15 figs., tables.) **DWB**—Various definitions of desert climate are discussed and data of

various stations in the Rajasthan Desert are plotted with reference to various definitions, in particular the arid and semi-arid definitions of DE MARTONNE. An analysis of climatic data for this region is presented in order to determine whether desert conditions are being intensified or extended. Graphic data are given on variation of mean rainfall, mean maximum and minimum temperature, and variation of wind velocity. It is concluded that, on the basis of meteorological data, the climate of the Rajasthan Desert has not deteriorated and that there has been no large scale extension of desert conditions to adjacent areas. *Subject Headings:* 1. Desert climates 2. Climate of Rajasthan Desert 3. Rajasthan Desert, India.—I.L.D.

9.8-247

551.582.2:519.241.1

Robinson, Arthur H. (*Univ. of Wis.*), *The necessity of weighting values in correlation analysis of areal data*. *Association of American Geographers, Annals*, 46(2):233-236, June, 1956. fig., eqs. DWB, DLC—Three states of equal size, but with counties of different sizes (in 2 cases), are shown to give widely differing coefficients of correlation (r) when values are not weighted ($r = .715, .875$ and $.500$, respectively). State No. 1 is assumed to be correct since its counties are all the same size. A method of statistical weighting (for size) is shown to give the same values for all 3 states. The analysis may be made by using a regression line, and the standard duration may also be computed using similar weights based on actual areas or relative areas of the sub-units. *Subject Headings:* 1. Areal correlation analysis 2. Weighted means.—M.R.

CLIMATIC VARIATIONS

See also: Biological climatology, Pointe Géologie, Adélie Land (Rivoliér), 9.8-30; Temp. trends, Atlantic coast, Canada (Thomas), 9.8-184.

9.8-248

551.583

Liakhov, M. E., *O kolebaniakh temperatury vozdukh v XIX i XX vekakh v vostochno-evropeiskom sektore severnogo polushariia*. [Fluctuations in air temperatures in the 19th and 20th centuries in the eastern European sector of the Northern Hemisphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geograf.*, No. 5:74-80, Sept./Oct. 1956. 3 figs., table, 10 refs. DLC—The article is concerned with the general problems of climatic change and the climatic changes, as recorded by instrumental observations that occurred in the 19th and 20th centuries in the European U.S.S.R., the Near East and eastern Africa. The method of smoothing of mean air temperature for moving ten-year periods was used to the complete observational records (up to 1950) of Leningrad, Moscow, Kazan, Sverdlovsk, Rostavl', Kon'-Kolydezh' (near Voronezh), Rostov-on-Don, Arkhangelsk, Kiev, Beirut, Aden and Antibes. Graphs showing secular variation of moving ten-year means of air temperature and isopleths of deviation of mean air temperatures from the normals along meridian 40° and along 55° N. lat. are presented. The climate shows definite warming in the 20's and 30's of the present century over a large part of the Northern Hemisphere and the fluctuation of climate takes place over large areas. The larger the period of fluctuation, the greater is the area over which fluctuation extends. *Subject Heading:* 1. Climatic changes.—I.L.D.

9.8-249

551.583

Panofsky, Hans A. (*Dept. of Met., Pa. State Univ.*), *Theories of climate change*. *Weatherwise*, Boston, 9(6):183-187, 204, Dec. 1956. port, 3 figs. DWB—Geologic, atmospheric and astronomical theories of Ice Ages and climatic changes are reviewed and criticized and the chief objections also examined critically. The author favors the Orbital Theory modified (over periods of millions of years) by mountain building. His argument is that we know that Orbital changes with a period of 20,000 yrs occur, whereas other factors supposed to cause changes are conjectural, or else the mechanisms are so poorly known that given causes are supposed by some to produce diametrically opposite effects from those proposed by others. *Subject Headings:* 1. Climatic change theories 2. Orbital theory of climatic changes.—M.R.

9.8-250

551.583 551.582(47,57)

Rubinshtein, E. S., *Ob ismenenii klimata SSSR za poslednie desiatletia*. [Climatic change in the U.S.S.R. in the last decades.] (In: Budyko, M. I. (ed.), *A. I. Voeikov i sovremennye problemy klimatologii*. Leningrad, 1956. p. 123-174. 15 figs., 2 tables, 6 refs.)

DWB—Essentially, this study is a continuation of the author's earlier work **K probleme menenii klimata** published in 1946. It is a comprehensive study of the evidence of climate change in the territory of the U.S.S.R. during the past 30–40 yrs. Data up to 1950 and even as late as 1955 are utilized for northern and eastern areas of the U.S.S.R. in which climatic changes had previously not been studied. The method of running means is used to analyze the climatic data. Running ten-year means of temperature for each month are presented for the period 1801–1950 for each month, and differences in mean monthly temperature for the period 1881–1950 and 1881–1935 are presented in graphs and tables, respectively. *Subject Headings:* 1. Climatic changes 2. Climate of U.S.S.R. 3. U.S.S.R.—*I.L.D.*

9.8–251

551.583.2:551.579.4

*Schwarzl, Siegfried, **Die Hochwasserbedrohung Wiens: Elementarereignisse an der Donau im Rahmen der Klimaentwicklung.** [The flood water threat to Vienna: elemental phenomena on the Danube within the framework of climatic evolution.] Vienna, 1956. 16 p. Charts (fold.) laid in, 5 photos, 14 refs. Note laid in: "Special No. 4 to **Wetter und Leben**."—The author investigates the problem whether historical elemental processes in the Danube region, of greater magnitude than those of the past 100 years, are entirely a matter of the past or whether they are likely to recur in the future. The study includes a brief summary of climatic evolutions in the postglacial period in the Danube region, climatic evolution during historical times, as illustrated by the mean air temperature in Vienna and winter coefficients for Western Europe computed by C. EASTON, glacial fluctuations in the Alps, especially that of the Pasterze glacier, flood water and ice jams on the Danube, and the water regime of the Danube and climatic evolution during the past 120 yrs. A table gives the occurrence of extreme winters since 1205 A.D. and charts show the relationship between elemental phenomena in Vienna and climatic evolution and the water regime of the Danube since 1820. *Subject Headings:* 1. Historical climates 2. Severe winters 3. Flood intensities 4. Danube.—*I.L.D.*

MICROCLIMATOLOGY

9.8–252

551.584.41

Pavlovskii, E. S., **Kharakter mikroklimaticheskikh uslovii v lesnykh polosakh pri korinnom sposobe vyrashchivaniia duba.** [Characteristics of microclimatic conditions in forest belts with oaks planted in rows.] *Meteorologiya i Gidrologiya*, Leningrad, No. 2:26–32, Feb. 1956. 2 figs., 4 tables, 3 refs. **DWB, DLC**—In connection with the establishment of forest shelter belts, it was found that the growth of rapidly growing varieties of oak is favored by planting in rows rather than in open stands, as a result of optimal microclimatic conditions. With the aid of relevant microclimatic data, presented in tables and graphs, the author discusses the soil moisture in a forest strip in 1953, the annual variations of soil moisture in 1952, mean daily values of the basic elements of the microclimate, daily variations of the microclimatic elements, indices of the growth of oak under different conditions of cultivation, etc. *Subject Headings:* 1. Forest microclimatology 2. Microclimatic control 3. Shelter belts.—*I.L.D.*

9.8–253

551.584.42:551.524.4

*Primault, B., **La température d'un pré.** [The temperature of a meadow.] *Switzerland. Meteorologische Zentralanstalt, Annalen*, 91, 1954, pub. 1955. Anhang, No. 7:4–7. 2 figs., 2 tables, 7 refs. **DWB**—In an experimental plot just south of the Swiss Central Meteorological Station, half of the grass was let grow to a height of 50 cm and half was kept mowed to a height of only 5 cm after May 15. Temperatures were recorded each hour for 5, 10, 15 and 20 cm by means of thermocouples, so the environment would not be disturbed by the observer. Observations, from June 23, 1951 to Sept. 12, 1951 are summarized by hours and months for each level, and the diurnal and day-to-day variations shown on charts—the latter in connection with wind, temperature, sunshine and precipitation. Differences between the mowed and the uncult plots show up in individual cases more vividly than in the means. In the interior of the tall grass conditions at night are uniform and unfavorable for frost, but at the edge and top of the grass, frost forms easily. Uniform conditions in interior of stand may favor insects and parasites. *Subject Headings:* 1. Meadow microclimatology 2. Grass temperatures 3. Zurich, Switzerland.—*M.R.*

9.8-254

551.584.6

Polli, Silvio, *Sulle misure di meteorologia ipogea*. [Meteorological measurements in caves.] *Trieste. Istituto Sperimentale Talassografico, Pubblicazioni*, No. 329, 1956. 5 pp. DWB. Reprint from *Congresso Nazionale di Speleologia, Atti*, Sept. 30–Oct. 2, 1954.—Measurements of pressure, temperature, wind, humidity and earth temperature in caves are discussed and the conclusion reached that the variations of these elements in caves are only 1/50 that outside, hence the instruments ought to be 50 times as sensitive. Since this is not possible beyond a certain point, more care must be exercised in making observations in caves. *Subject Headings*: 1. Cave microclimates 2. Instrument accuracy 3. Micrometeorological instrumentation.—M.R.

9.8-255

551.584.6

Stupishin, A. V., *Pervye temperaturnye nabludeniiia v peshcherakh*. [The first temperature observations in caves.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Leningrad, Izvestiia*, 88(4):387–388, July/Aug. 1956. table, 13 refs. DLC—The first meteorological observations in caves in Russia were made in the Boznukov cave near the P'iane River (Gorki Oblast) by P. S. PALLAS. The original record is reproduced and the numerical observations are converted into centigrade degrees. Some data on present day temperatures of caves along the Volga River are presented. *Subject Heading*: 1. Cave temperatures.—I.L:D.

CLIMATIC CLASSIFICATION

9.8-256

551.585.53(661)

Pierre, Franklin, *Le peuplement entomologique et ses rapports avec la végétation dans les sables vifs de la zone aride*. [The insect population and its relationship to vegetation in moving sands of the arid zone.] *UNESCO, Arid Zone Research*, No. 5 (Plant Ecology Proceedings of the Montpellier Symposium), p. 107–116, pub. 1955. English summary p. 116. DWB—Climatic factors as rainfall, evaporation, temperature, relative humidity are carefully described. The mesoclimate of the soil, the endoclimate of the sand and microclimatic aspects are discussed. Most of the data are given for Béni Abbès. *Subject Headings*: 1. Insect ecology 2. Desert climatology 3. Béni Abbès, French Sahara.—A.A.

BIOCLIMATOLOGY

See also: Biol. climatology, Pointe Géologie, Adélie Land (Rivoliér), 9.8-30; Animal climatology, Brazil (Mota), 9.8-74; Thermal insulation in temperate clim. (Becher), 9.8-86; Bioclimatic charts and architectural met. (Olgyay), 9.8-92; Comfort zones and marine bioclimatology (Malhotra), 9.8-93; Climate, Rajasthan Desert, India (Pramanik et al.), 9.8-246.

9.8-257

551.58

†Thams, J. Chr., *Ueber die Bedeutung klimatologischer Untersuchungen für die Bioklimatologie*. [The importance of climatological investigation for bioclimatology.] *Schweizerische Gesellschaft für Balneologie und Klimatologie, Annalen*, No. 38: 87–98, 1947. 15 foot refs. DLC—The author stresses the need for long series of meteorological observations, the insufficiency of mean climatic values and the value of frequency statistics for bioclimatic studies, the need for radiation data in addition to those of temperature, pressure, precipitation etc. Also the measurement of cooling power, weather sensitivity scales, the role of air masses in bioclimatology and the importance of the climate near the ground are discussed. *Subject Heading*: 1. Bioclimatology.—I.L:D.

9.8-258

551.58

Sargent, Frederick, II, *A prospectus of bioclimatology: historical observations on its national and international growth*. *Federation of American Societies for Experimental Biology, Federation Proceedings*, 16(2):603–606, July 1957. 27 refs. DLC—A general discussion of the aims of bioclimatology, its historical origin, the present status in the U. S. and in the world in general; an outline of a proposal for providing training in bioclimatology as an integrated discipline. *Subject Heading*: 1. Bioclimatology.—I.L:D.

9.8-259

551.586:61

†Saenz de la Calzada, Carlos, **Los fundamentos de la geografía medica.** [Fundamentals of medical geography.] *Sociedad Mexicana de Geografía y Estadística, Boletín*, 81(1), Jan./Feb. 1956. 174 p. 19 figs., 45 refs. DWB—In this monograph on medical geography, the author devotes considerable space to the role of climate and weather in the causation and clinical manifestation of human diseases. Various examples from medical literature on the seasonal occurrence of diseases, the effect of radiation in particular ionic radiation upon man, air pollution, etc. are cited. The treatment is more literary than scientific and not very critical. However, as a whole, this is an interesting and balanced survey of the field of medical geography. *Subject Headings:* 1. Weather effects on diseases 2. Medical meteorology 3. Medical geography.—I.L.D.

9.8-260

551.586:612.014.43:628.8

Thom, Earl C. (*Office of Climatology, U. S. W. B., Wash., D. C.*), **Measuring the need for air conditioning.** *Air Conditioning, Heating and Ventilating*, N. Y., 53(8):65-70, Aug. 1956. 8 figs., table, 6 refs. DLC—Various methods of measuring air conditioning requirements are reviewed briefly and the author points out the impracticability of the effective-temperature scheme in determining air conditioning needs and load. A Discomfort Index, based upon the mean of dry and wet bulb temperature, which corresponds to the effective temperature readings, is proposed and its use is illustrated. A table giving percentage frequency and means of Discomfort Index for Baltimore and maps with isolines of Discomfort Index for various summer months and specific time of day for the U. S. are presented. *Subject Headings:* 1. Air conditioning 2. Discomfort Index.—I.L.D.

9.8-261

551.586:631.95

Rosini, Ezio, **Su un indice di rendimento in meteorologia agraria.** [Efficiency index in agricultural meteorology.] *Annali di Geofisica*, Rome, 10(1/2):41-48, 1957. 8 figs. Italian and English summaries p. 48. DLC—The concept of meteorological equivalent, one of the main points of agricultural ecology, is critically examined. It is shown that this concept can be replaced by an efficiency index, the application of which is shown in some examples. The simultaneous dependence of the efficiency on two meteorological factors is considered; in what manner the statistical examination of this dependence can be made is shown and the complex efficiency index is defined. *Subject Headings:* 1. Crop ecology 2. Climatic indexes 3. Agricultural climatology.—*Author's abstract.*

UPPER AIR CLIMATOLOGY

See: Aerology manuals, 9.8-8; Upper air atlases, N. Hemisphere, 9.8-9.

MISCELLANEOUS

COSMIC INFLUENCES

See also: Lunar effects (Kapás), 9.8-175.

9.8-262

551.590.21:523.75

Farthing, E. D. (*Trans World Airlines*), **Weather changes associated with coronal activity.** *Colorado Univ. High Altitude Obs. Inst. for Solar-Terrestrial Research, Technical Report*, No. 1, 1956. Lecture No. 22 (5 p.). 3 tables. DWB—Some results achieved by way of the new index of coronal activity are discussed here. This index is shown to be reasonably representative for the solar activity responsible for weather and circulation changes under discussion. *Subject Headings:* 1. Solar-weather relationships 2. Solar activity 3. Solar corona indexes.—W.N.

9.8-263

551.590.21:550.385.24:551.521.31

Herinck, P., **La variation annuelle et semi-annuelle du champ magnétique horizontal et le rayonnement solaire.** [Annual and semi-annual variations of the horizontal magnetic

field, and solar radiation.] *Belgium. Académie Royale des Sciences Coloniales, Bulletin des Séances*, 3(6):1200-1213, 1957. 5 figs., 3 tables, 8 refs. **DLC**—By means of a harmonic analysis of monthly means of the components of the geomagnetic field during one year, two waves are identified, one with a 6-month and one with a 12-month period. The phase of the 6-month wave practically does not change with latitude, while the phase of the 12-month wave varies by some 180° between the two hemispheres. The six-month wave is due to solar corpuscular radiation whose action is opposite that of electromagnetic radiation. The amplitude of the 6-month wave appears to increase toward higher latitudes. This peculiarity is probably connected with auroral activity and the structure of the ring current. *Subject Headings: 1. Geomagnetic variations 2. Solar-geomagnetic relationships.—A.V.*

9.8-264

551.590.21:551.543

Palmer, C. E. (*Inst. of Geophysics, Univ. of Calif.*), **The simultaneous pressure oscillation of barometers along the equator.** *Colorado. Univ. High Altitude Obs. Inst. for Solar-Terrestrial Research, Technical Report*, No. 1, 1956. Lecture No. 17 (5 p.). 3 figs., ref. **DWB**—The conclusion is that either pressure changes above 100 mb must be transmitted directly to the surface, causing upper tropospheric warming, or a compensation takes place within the troposphere. In either case, synoptic changes will supervene upon changes in mesospheric divergence. *Subject Headings: 1. Solar-pressure relationships 2. Pressure oscillations.—From author's text.*

9.8-265

551.590.24:551.510.535

Nicolet, M., **Interpretation of ionospheric results during eclipses.** *Belgium. Institut Royal Météorologique, Contributions*, No. 29:537-538, 1956. eq., 6 refs. **DWB**—Discrepancies in ionospheric results observed during eclipses are explained by accounting for the effect of scale-height variation with height due to a possible variation of the temperature gradient with latitude. The recombination coefficient should be greater than all published values. *Subject Heading: 1. Eclipse effects on ionosphere.—A.A.*

VISIBILITY

9.8-266

551.591.3(521.27):551.509.325

Yamada, N., **Visibility at the Tokyo International Airport.** *Journal of Meteorological Research*, Tokyo, 8(7):409-421, Aug. 1956. 14 figs., 20 tables. In Japanese; English summary, p. 409. **DWB, DLC**—A statistical study of visibility at the Tokyo International Airport is made, based on the data of 2 years (1950-1951). Many tables and figures which may be useful for the daily forecasting of visibility at the air-port are obtained. In these tables and figures, 1) diurnal and annual variations of mean visibility, 2) frequency of occurrence of specified obstructions to vision, such as haze smoke, fog, rain, etc., 3) frequency of occurrence of poor visibility ranges and mean visibility for selected obstructions to vision, specified wind directions or speed ranges, specified lapse rate ranges and specified ceiling heights are included. *Subject Headings: 1. Visibility data 2. Visibility forecasting 3. Tokyo, Japan.—Author's abstract.*

9.8-267

551.591.3(521.27):551.509.325

Yamada, N., **Visibility at the Tokyo International Air-Port, Pt. 3.** *Journal of Meteorological Research*, Tokyo, 9(2):76-98, March 1957. 33 figs., 17 tables. In Japanese; English summary, p. 76. **DWB, DLC**—In order to investigate the changes of visibility due to haze and smoke at the Tokyo International Air-Port in more detail, a statistical study in days with no fog or precipitation is made from the standpoint of visibility forecasting. In many tables and figures presented, hourly and monthly frequency of occurrences of restricted visibility ranges and variations of mean visibility in days with no fog or precipitation are included. Changes of visibility in days with no fog or precipitation are classified by 4 types as follows: 1) no obstructions to vision, 2) poor visibility due to haze and smoke at evening only, 3) poor visibility due to haze and smoke at morning only, and 4) poor visibility due to haze and smoke at morning and evening. The characteristic pressure patterns in weather chart for these visibility changes are selected. Fogs formed at the air-port are classified by 2 types of radiation

fog (including advection-radiation fog) and frontal fog. The effects of these occurrences on visibility are discussed and the characteristic pressure patterns for these 2 types are chosen. *Subject Headings:* 1. Visibility in haze 2. Visibility in smoke 3. Visibility forecasting 4. Tokyo, Japan.—*Author's abstract.*

OPTICAL PHENOMENA

9.8-268

551.593 535.33

Kay, Irvin and Moses, Harry E., *The determination of the scattering potential from the spectral measure function*, pt. 3, Calculation of the scattering potential from the scattering operator for the one-dimensional Schrödinger equation. N. Y. Univ. Inst. of Mathematical Sciences. Div. of Electromagnetic Research, Contract AF 19(122)-463, Research Report No. CX-20, Sept. 1955. 38 p. 8 refs., numerous eqs.—A procedure discussed in previous papers for the calculation of the scattering potentials from the spectral measure functions associated with certain eigenfunctions of the continuous spectrum of the perturbed Hamiltonian, has been adapted to the problem of obtaining the scattering potential from the scattering operator for the one-dimensional Schrödinger equation ($-\infty < X < \infty$). Examples are given to show how the procedure may be used. *Subject Headings:* 1. Spectroscopy 2. Scattering potential.—A.A.

9.8-269

551.593.1

Poncelet, Lucien, *Un curieux phénomène de réfraction atmosphérique*, [A curious phenomena of atmospheric refraction.] *Ciel et Terre*, Brussels, 71(9/10):350-351, Sept./Oct. 1955. photo. DWB, DLC—Conditions which prevailed during the optical illusion of a double sun (photo) are outlined. *Subject Headings:* 1. Refraction phenomena 2. Optical illusions.—A.A.

9.8-270

551.593.12:551.593.1

Van Isacker, J. (*Inst. Roy. Mét., Uccle, Belgium*), *Scintillation des étoiles*. [Scintillation of stars.] *Scientia*, Milan, 92(545):229-231, Sept. 1957. DWB, DLC—The scintillation of stars has only recently been explained adequately. It is now known to be a purely atmospheric phenomenon mainly due to the refraction of light by a turbulent atmospheric layer. By combining RAYLEIGH's theory with certain ideas of MONTIGNY all known aspects of the phenomenon can be explained, including the variation of the color of stars. *Subject Headings:* 1. Scintillation 2. Refraction of light.—A.V.

ELECTRICAL PHENOMENA

See also: Radar echoes from lightning (Pawsey), 9.8-104; Atmos. electricity meas. systems (Fitzgerald), 9.8-124; Potential gradient meters (Saxer, Sigrist), 9.8-125; special bibliog. on Radar Meteorology, p. 1005.

9.8-271

551.594.1/2(521.25)

*Kondo, G. and Uchikawa, K., *Kite-balloon observations of atmospheric electricity in the lower atmosphere*. *Journal of Meteorological Research*, Tokyo, 7(10):663-670, Dec. 1955. 14 figs., 2 tables, 10 refs., eq. In Japanese; English summary p. 663. DWB, DLC—Measurements of electric conductivity and current in the lower atmosphere up to 200 m above the ground were taken by means of a kite-balloon at the Honjo Branch Station, the Aerological Observatory, from Dec. 1952 to Oct. 1953. The Gerdien condenser was used for the former and a brass stick with a polonium collector at its top for the latter. Meteorological conditions in the lower atmosphere were observed simultaneously. In this report accounts are given of the apparatus and of some of the results obtained. *Subject Headings:* 1. Atmospheric electricity data 2. Kyttons 3. Japan.—*Authors' abstract.*

9.8-272

551.594.1/2

Ruttenberg, S. and Holzer, R. E. (*Geoph. Inst., Calif. Univ. at L. A.*), *Atmospheric electrical measurements in the Pacific Ocean*. U. S. Air Force. Cambridge Research Center,

Geophysical Research Papers, No. 42:101-108, Nov. 1955. 6 figs., table, 4 refs. **DLC**—An atmospheric-electric research program was conducted during "Operation Capricorn," a five month's geophysical marine expedition to the central Pacific undertaken by the Scripps Institution of Oceanography of the University of California. Continuous records of the potential gradient and positive conductivity were obtained from a field-mill instrument and a Gerdien-type conductivity apparatus, respectively. Mean monthly values and diurnal curves of both variables are presented. The seasonal mean diurnal curves of the potential gradient on Operation Capricorn are in striking agreement with the corresponding seasonal mean curve for Cruise VII of the "Carnegie," indicating no important secular change in the diurnal seasonal pattern. Some evidence is found for a small local diurnal effect superimposed on the global fluctuation of potential gradient. *Subject Headings: 1. Atmospheric electricity measurements 2. Potential gradient 3. Operation Capricorn 4. Pacific Ocean.—Authors' abstract.*

9.8-273

551.594.11

Fuchs, Josef (Vienna), **Report on some observations on atmospheric electricity.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 42:135-139, Nov. 1955. 3 figs. **DLC**—The audio-frequency phenomena of "whistlers" or "sifflaments," which can be heard in long wires as a musical tone descending in frequency from several kilocycles to nearly zero cycles within an interval of about one second, was observed at the Sonnblick Observatory (elevation 10,200 ft) continuously over a six-year period. It shows a daily and a yearly fluctuation (TRABERT; CONRAD). Studies of potential-gradient measurements made during times of disturbed weather have shown distinct characteristics associated with the passage of different types of meteorological fronts. The form of the potential-gradient curve as a function of time during the passage of cold fronts is quite unique and easy to distinguish from that during the passage of warm fronts (SEPER). Observations of the kind of atmospherics called "grinders" and "clicks" have shown that the former, probably resulting from glow discharges, exist only during the earlier phases of the development of a thunderstorm, while the latter, resulting from normal lightning flashes, predominate during the storm's main phase and thereafter. Continuous observations of grinders and clicks are therefore a valuable source of information about the electrical state of weather situations and also give indications about the dynamic processes involved. *Subject Headings: 1. Whistlers 2. Electricity of disturbed weather 3. Potential gradient measurements 4. Sonnblick, Austr'a.—Author's abstract.*

9.8-274

551.594.11

Pluvinaige, P. (*Expéditions Polaires Françaises*), **Some results of atmospheric electricity measurements on the Greenland Icecap.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 42:109-112, Nov. 1955. 3 figs., table, 6 refs. **DLC**—Some measurements of the potential-gradient on the Greenland Icecap are reported. During fair weather, the values are a little higher than over oceans. With the data already published, one can compute an air-earth current density which is nearly the same as found by DAUVILLIER on the east coast, so that the maintenance of a state of equilibrium with a well-pronounced electrode effect is likely. In the presence of snow drift the values are very great, generally positive, and are correlative to the impact of ice particles on the insulated collector. One experiment shows that the true charge of the ice particles near the ground is very significant but negative. Therefore it is probable that the ice-metal friction constitutes the main agent of electrification of the insulated collector. *Subject Headings: 1. Potential gradient measurements 2. Air-earth current density 3. Greenland Ice Cap.—Author's abstract.*

9.8-275

551.594.11:551.510.7

Reiter, Reinhold, **Registrierung des Potentialgradienten, Messung der polaren elektrischen Leitfähigkeit der Luft sowie der relativen Luftradioaktivität und Bestimmung des NO₂-gehaltes von Niederschlägen und Nebeln auf dem Zugspitzplatt (2580 m NN) im Sommer 1955.** [Registration of potential gradient measurement of polar electric conductivity of the air and of the relative radioactivity of the air and determination of the NO₂ content of precipitation and fog in the Zugspitzplatt (2580 m at sea level) in the summer of 1955.] *Geofisica Pura e Applicata*, Milan, 33:187-222, 1956. 19 figs., 8 tables, 28 refs. German and English

summaries p. 187-188. **DLC**—During this excursion, the author recorded potential gradient air temperature, relative humidity and solar radiation and measured total as well as positive and negative conductivity of the air, number of condensation nuclei, related radioactivity of the air and NO_2 content of precipitation and clouds. For the synoptic evaluation of the results, the records of six other atmospheric electricity stations situated between 700 and 1000 m elev. were used. It is shown that studies in atmospheric electricity at stations situated on high elevations facilitate the study of the electric structure of the atmosphere during precipitation and in the presence of different kinds of clouds. The behavior of the electric field and conditions in the presence of different clouds and during the change of precipitation from the solid to the liquid state are discussed. Data are given also on electrical conductivity during fog and on the presence of clouds irradiated by the sun, etc. A close relation was found between the NO_2 ion concentrations in precipitation and fog and the electrical structure and electrical activity of clouds. In the Northern Alps atmospheric conductivity is influenced by wind; maximum radioactivity is found when winds are SE-SW. It was found that water vapor pressure and number of nuclei do not account for the correlation between atmospheric electric conduction and convection; this is also true of inversions. *Subject Headings:* 1. Potential gradient measurements 2. Radioactivity in the atmosphere 3. NO_2 measurements 4. Zugspitze, Germany.—(Based on author's abstract.)—I.L.D.

9.8-276

551.594.13

Schilling, Gerhard F. (*Inst. of Geoph., Univ. of Calif. at L. A.*), **On the variation of electrical conductivity of air with elevation.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 42:53-58, Nov. 1955. 2 figs., table, 14 refs. **DLC**—Measurements of the electrical conductivity of air have been made at both land and sea stations in California and in the Pacific Ocean. The observation sites were located in a variety of different climatic regions and ranged from shipboard locations to mountain tops exceeding 4000 m in elevation. The evaluation of the results shows a consistent increase of the mean value of positive conductivity with station elevations, essentially independent of location. A similar consistency is found for the altitude variation of the mean diurnal fluctuation which follows an exponential expression, decreasing with elevation. The comparison of the surface measurement results with free atmosphere data, which was obtained by other investigators during airplane and balloon flights, leads to unexpected agreement between mean absolute values at corresponding heights. It is not yet possible to present a complete explanation of the observation but possible effects of the variation of nuclei and radioactive substances present in the atmosphere are discussed. *Subject Headings:* 1. Electrical conductivity variations with altitude 2. California 3. Pacific Ocean.—*Author's abstract.*

9.8-277

551.594.2:551.501.83

Kimpara, Atsushi, **The waveform of atmospherics in the daytime and at night.** *Nagoya. Univ. Research Institute of Atmospherics, Proceedings*, 4:1-19, Dec. 1956. 45 figs., 13 refs. **DWB**—A study based on the author's work in Japan in 1940-44, and since 1950, using a 3-point network of direction finding stations. Records are analyzed and classified for daytime and nighttime waveforms and the mechanisms which cause the variations discussed. The waveform of atmospherics is said to depend greatly on the propagation conditions so that there is a clear difference between day and night records. In the day there are 1) stepped leader stroke, partial discharge within clouds and successive discharges among clouds; 2) return streamer and 3) multiple stroke types. At night there is 1) the stepped leader, partial discharge and successive discharge; the 2) return streamer, 3) the slow tail, and 4) reflection echo type. *Subject Headings:* 1. Sferics waveforms 2. Diurnal sferics variations 3. Japan.—M.R.

9.8-278

551.594.21:551.515.4

Borbély, Edit, **Záporok és zivatarok megfigyelésének, a zivatarfelhők elektrizációjának néhány kérdése.** [Problems of shower and thunderstorm observation and thundercloud electrification.] *Időjárás*, Budapest, 61(1):52-54, Jan./Feb. 1957. **DLC**—Recent Soviet literature on thunderstorm occurrence and thundercloud electrification is reviewed. The authors referred to are V. M. MUCHNIK (problems in shower and thunderstorm statistics), BOGATIR and ROMOV (height of the -10° and -20°C isotherms in May and Sept.), BURG-

DORF (thunderstorm frequency in the Caucasus as related to surface temperature), IMIATINOV and CHUVAEV (electrification of cloud particles) and ARABADZHI (electrification of non-freezing and freezing clouds). From works of the last mentioned author, the reviewer concludes that the electrical properties of a cloud can be significantly changed by stimulating the development of the ice phase. By so doing cumulus congestus clouds can be transformed into thunderclouds. The growth of the electric charge to thundercloud strength takes 10 to 30 min from the establishment of the ice phase, and is followed by precipitation. *Subject Headings:* 1. Thundercloud electrification 2. Thunderstorm frequencies.—G.T.

9.8-279

551.594.21:551.501.81:551.515.41

Brook, Marx (*N. Mexico Inst. of Mining and Tech.*), **Relationship between the initial radar echo and the initial electric field in isolated thunderstorm cells.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 61-68. fig., 2 tables, 3 refs. DWB (M01.81 R124pc)—The results of a field study on the initiation of electric fields in isolated thunderstorms are presented and compared with the findings of previous studies. The initial radar echo is found to precede the initial electric field by an average time of about 10 minutes. The top of an echo when it first evidences electrification is always found above approximately 21,000 ft, i.e., colder than -10°C . Echoes which do not grow above this level do not produce detectable electric fields. The tops of initial echoes were found to occur at temperatures from 2°C to -10°C , with an average value of -4°C . Comparison of these results with a recent study by LUDLAM and MASON suggests strongly that the height of the top of the initial echo is determined by the height of the zero-degree isotherm, rather than by the height of the cloud base. This indicates that a melting process, rather than a coalescence process, may be responsible for producing many of the initial radar echoes in thunderstorms. *Subject Headings:* 1. Radar echoes from thunderstorms 2. Thunderstorm electricity.—Author's abstract.

9.8-280

551.594.21:551.574.1

Muchnik, V. M., **O vozmoznykh mekhanizmaxh elektrizatsii gidrometeorov v kuchevo-dozhdevykh oblakakh.** [Possible mechanisms for the electrification of hydrometeors in cumulonimbus clouds.] *Leningrad. Glavnaia Geofizicheskaya, Observatoriia, Trudy*, 58 (120): 53-57, 1956. 3 refs., 2 figs., 3 tables. DLC—In connection with studies on the mechanism of electrification of ice or hail particles during collision in clouds, the author investigated experimentally under laboratory conditions the electrification, during collision, of spheres with grains of powder. The spheres were considered as models of hail and the powder grains as models of snow. A schematic drawing and a description are given of the apparatus, which consists of a glass tube 6 cm. in diameter and 11.5 cm. in height. On its upper part, a tube of cardboard about 50 cm long is placed. In the lower portion is attached a cone, with a neck 3 cm. in diameter, into which the nozzle of a centrifugal ventilator is inserted. The data are presented on the electrification of still spheres with powder grains and on the magnitude of the charge of drops during different field potentials for drops torn off from melting ice particles in an electric field. *Subject Headings:* 1. Thundercloud electrification 2. Droplet electrification.—I.L.D.

9.8-281

551.594.21

Reynolds, S. E. (*N. Mex. Inst. of Mining & Tech., Socorro*), **Thunderstorms charge structure and suggested electrification mechanisms.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 42:162-167, Nov. 1955. 5 figs., 5 refs. DLC—The WORKMAN-HOLZER technique for determining the sign, magnitude, and location of charge centers in thunderstorms has been improved and applied to storms occurring in New Mex. during the summer of 1952. The technique and the results obtained are described. The study revealed that the temperature of the environment of the negative charge centers may vary from about 0°C to about -33°C and that the corresponding positive charge center is usually found about 2000 ft above the negative center. The probable charge separation mechanisms are discussed in the light of the charge configuration and the physical environment deduced from this study. Laboratory experiments which demonstrate charge separation mechanisms which can be effective in this environment are discussed. *Subject Headings:*

1. Thunderstorm electricity 2. Electrical charge separation mechanisms 3. New Mexico.—
Author's abstract.

9.8-282

551.594.221

Malan, D. J. (*Bernard Price Inst. of Geophysics, Univ. Johannesburg*), **Visible electrical discharges inside thunderclouds.** *Geofisica Pura e Applicata*, Milan, 34:221-223, 1956. 2 figs. (photos), 2 refs. **DLC**—The vertical dimensions of the negatively charged region tapped by a lightning discharge, and the observations of visible streamers occurring within isolated convective clouds are discussed. Two photographs of isolated convective clouds and lightning streamers are reproduced and described. It is concluded that "the negatively charged region of the thundercloud reaches an altitude of at least 8 km above the ground, that is 9.8 km above the mean sea level, the negatively charged region has a horizontal extent of about 8 km, and the positively charged region is situated above the 8 km altitude." *Subject Headings: 1. Lightning discharges 2. Convective clouds.—I.L.D.*

AURORAS

See also: Radio wave propagation, Arctic (Little), 9.8-29; Auroral frequencies, Polar regions (Mayaud), 9.8-31.

9.8-283

551.594.5

Van Sabben, D., **Het poollicht van 29 September 1957.** [The aurora of Sept. 29, 1957.] *Hemel en Dampkring*, 56(1/2):21, Jan./Feb. 1958. **DLC**—Brief report of several observations of aurora in the Netherlands on Sept. 29, 1957. *Subject Headings: 1. Auroral observations 2. Netherlands.—A.V.*

9.8-284

551.594.51

Omholt, A. (*Fulbright Res. Fellow, on leave from Auroral Obs., Tromsø, Norway*), **Excitation and ionization by secondary electrons in aurorae.** Chicago. Univ. Yerkes Obs., Contract AF 19(122)-479, 1957 (?). 7 p. fig., 9 refs., 4 eqs. **DWB** (\$23.59 Y47t)—Illustrative computations on the excitation and ionization by secondary electrons have been carried out. It is shown that, for aurorae caused by fast incident particles, one should expect the ratio between the rates of excitation of the red and green [OI] lines to be higher than 12. The relative rates of excitation of the green [OI] line and the First Negative N₂ bands are much more dependent on the energy distribution of the ejected secondary electrons, but the theoretical estimates are in reasonable agreement with the observed auroral intensities. *Subject Heading: 1. Auroral energy excitation mechanism.—Author's abstract.*

9.8-285

551.594.51:551.521.9

Singer, S. F., **Thermonuclear processes in the aurora.** Maryland. Univ. Physics Dept., Contract AF 18(600)-1038, Technical Report, No. 52, August 1956. 11 p. 3 figs., 4 tables, 16 refs., 7 eqs. **DWB**—The suggestion is made, and the consequences elaborated upon, that γ radiation occurring during auroras could result in rare but important thermonuclear reactions, which would allow high energy radiations to penetrate much lower in the atmosphere than the 80-100 km lower limit of the aurora itself. One half of the energy produced by these reactions would penetrate downward and have geochemical consequences. The nuclear effects would be important in design of the outer skin of space vehicles. Study of the nuclear processes involved can also contribute to knowledge of the aurora itself. *Subject Headings: 1. Nuclear reactions in auroras 2. Auroral radiations 3. Satellite design.—M.R.*

9.8-286

551.594.51:535.33

Tanaka, Y.; Jursa, A. and Leblanc, F. (*all, GRD, Air Force Camb. Res. Cen., Mass.*), **Vacuum ultra-violet spectra of the afterglows of pure N₂ and a mixture of N₂ and O₂.** (In: *The threshold of space*, (ed.) by M. Zelikoff. N. Y., Pergamon Press, 1957. p. 89-93. 2 figs., 2 tables, 8 refs.) **DLC**—Four different stages of afterglow can be produced by simply changing the O₂ partial pressure in a mixture of N₂ and O₂. In the first stage (pure N₂), the α' Ilg-X'Zg+ bands were observed in emission, and the atomic nitrogen ⁴S, ²D, ²P states were

observed in absorption. In the succeeding three stages (blue, dark, and greenish-gray) $N(^4S)$, $O(^3P)$ and $NO(X^2II)$ were observed in absorption together with several unidentified bands which appeared in the region 1400–1500 Å. The reaction mechanisms are discussed briefly for each stage of the afterglow, considering both emission and absorption spectra. *Subject Heading: 1. Afterglow spectra.—Authors' abstract.*

9.8-287

551.594.51:551.507.362.1

Van Allen, James A. (*State Univ. of Iowa*), **Direct detection of auroral radiation with rocket equipment.** *National Academy of Sciences, Wash., D. C., Proceedings*, 43(1):57–62, Jan. 1957. 3 figs., 5 refs. **DLC**—A soft radiation measured above 50 km with rocket-borne Geiger tubes (1953–1955) is interpreted as X-rays (confirmed by laboratory experiments). This radiation is associated with primary auroral radiations (similar latitude distribution) but is not itself primary in nature. It appears reasonable to assume the X-rays to be bremsstrahlung from primary electrons. *Subject Heading: 1. Rocket measurement of auroral radiation.—G.T.*

9.8-288

551.594.52:771

Elvey, C. T. (*Geophys. Inst., Univ. of Alaska*), **Problems of auroral morphology.** *National Academy of Sciences, Wash., D. C., Proceedings*, 43(1):63–75, Jan. 1957. 7 figs., 13 refs. **DLC**—Physical processes involved in various types of auroral displays are discussed with particular reference to auroral observations made in Alaska with the help of all-sky cameras. Such cameras show the distribution of auroras over elliptical areas with axes of 1000 and 2000 km. Sample photographs and a chart showing auroral distribution over Alaska as derived from a photograph are presented. Observation of the extremely rare red arc phenomenon on Feb. 25, 1956 is described. It is suggested that different degrees of upper atmospheric ionization may account for the considerable variations of auroral heights (from 70 to over 300 km). *Subject Headings: 1. Auroral photography 2. Auroral arcs 3. Auroral heights.—G.T.*

PART II. RECENT LITERATURE ON RADAR METEOROLOGY

Compiled by: *Geza Thuronyi*

INTRODUCTORY NOTE

Two bibliographies on Radar Meteorology have been previously published in *Meteorological Abstracts and Bibliography* (2(8):680-711, Aug. 1951 and 6(7):997-1050, July 1955). In the last two years, since the publication of the second bibliography, we have continued to include literature on radar meteorology in our current abstracts, but due to space limitations, more and more material remained in our files. This accumulated material is now presented to the reader in order to bring our coverage of this important field completely up to date. To facilitate use of the over 100 items, a subject outline has been prepared in which reference is also made to abstracts published in MAB since the last bibliography on radar meteorology.

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See also: **Dangerous weather avoidance** (White), 9.8-62; **Radar meteorology** (Hille), 9.8-102; **Rainfall measurement** (Hiser), 9.8-103; **Observations of lightning** (Pawsey), 9.8-104; **Stability** (Schuetz), 9.8-105; **Rainfall estimates** (Semonin), 9.8-106; **Tracking hurricanes** (Senn), 9.8-107; **Measurement of weather noise** (Stone), 9.8-200; **Initial electric field in thunderstorm cells** (Brook), 9.8-279.

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9H-1

550.501.81:551.577.11

Aden, A. L. Microwave reflection from water spheres. *American Journal of Physics*, 19(3): 163-167, March 1951. 4 figs., 19 refs. DLC—Object in field of electromagnetic wave removes energy from field, some of which is dissipated internally as heat, and some reradiated to produce secondary or scattered field: back scattering cross section is lumped measure of ability of scattering object to reradiate: study of back scattering cross section for water spheres with particular reference to radar reflection from rain. *Subject Heading*: 1. Radar precipitation echoes.—*Author's abstract*.

9H-2

551.501.81:551.577.11

Atlas, David. Origin of "stalactites" in precipitation echoes. *Weather Radar Conference*, Sept. 1955, *Proceedings of the Fifth . . . Conference*, pub. 1956. p. 321-328. 3 figs. DWB—Precipitation stalactites hang almost straight down, contrary to the theory of precipitation trails. The main factors in their formation are: precipitating cloud, very dry air beneath and a considerable wind shear. Precipitating cloud soon evaporates in the region of the wind shear, thereby cooling the air in its path. Later, a cellular convection commences in the layers of air until air containing the precipitation element begins to form some pendulous bulges. *Subject Heading*: 1. Radar precipitation stalactites.—N.N.

9H-3

551.501.81:551.577

Austin, Pauline M. (*Weather Radar Res., M.I.T.*), **Distribution of precipitation echoes as observed by radar at Cambridge, Massachusetts.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 221-226. 4 figs., table, 4 refs., 3 eqs. DWB (M01.81 R124pc)—A survey is being made of the frequency of occurrence and distribution of echoes from precipitation within a range of 120 mi of Cambridge, Mass. Some results for 27 summer storms observed on the SCR-615-B and 38 on the AN/CPS-9 are presented here. The storms are grouped according to synoptic type. The data have been analyzed to show the probability of detection of precipitation as a function of range and also to indicate local regions where precipitation occurs most persistently. The probability of detection decreases more or less linearly with range beyond 30 mi for the SCR-615-B radar and 60 mi for the AN/CPS-9. The region where precipitation is most persistent differs for the various types of storms. *Subject Headings: 1. Radar precipitation echoes 2. Radar precipitation echo distribution 3. Cambridge, Mass.—Author's abstract.*

9H-4

551.508.85

Austin, Pauline M. (*M.I.T.*), **Radar as a meteorological instrument.** *Weatherwise*, Boston, 10(3):76-81, June 1957. 6 figs., 3 refs. Also *Review: Bilancini, R., Il radar e la meteorologia. Rivista di Meteorologia Aeronautica*, Rome, 18(1):47-48, 1958. DWB—A brief description and illustration of weather radar and a summary of applications in detecting areas and movements of rain and snow, sleet and hail; rainfall rates, and for detecting and tracking severe storms (thunderstorms, squall lines, tornado areas, hurricanes) and storm structure, turbulence fields, etc. in horizontal and vertical dimensions. While not too accurate at present, it is especially useful in local forecasting and precipitation climatology, or hydrology. *Subject Heading: 1. Weather radar applications.—M.R.*

9H-5

551.501.81:551.577

Bailey, Robert W., **On the motion of precipitation echoes in a cyclone.** *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 121-129. 7 figs. DWB—During the cyclone of 29-30 Sept., 1954 in Oklahoma-Kansas-Missouri area, radar echo motion vectors were measured and an isotach field was drawn every 2 hrs. Between the axis of maximum motion and the slower isotach values there was precipitation. From a study of the various observed values in different directions it could be established that precipitation occurred on the east gradient of the maximum motion stream. *Subject Headings: 1. Radar precipitation movement studies 2. Precipitation areas.—N.N.*

9H-6

551.501.81:551.576.11:551.578.11

Bartnoff, Shepard, **Interpretative techniques in radar meteorology.** Tufts Univ. Dept. of Physics. Research Lab. of Physical Electronics, Contract AF 19(604)-550, Final Report, July 27, 1955. 10 p. 10 refs. DWB—The report summarizes essential findings in studies on drop size distribution and visibility in clouds and precip., using BOUCHER's data obtained at Cambridge, AUFM KAMPE and WEICKMANN's 1950 data obtained in Cu clouds, and DIEM's (1948) data (see 6.2-270, Feb. 1955, MAB). Next a study on optical raindrop spectrometers is summarized and then one on scattering of electromagnetic radiation from a dielectric prolate spheroid. Finally one on computation of moments of theoretical and observed drop size distributions and their analysis. *Subject Headings: 1. Radar cloud physics research 2. Drop size distribution.—M.R.*

9H-7

551.501.81:551.576.11

Battan, Louis J. (*Chic. Univ.*), **Implications of convective cloud observations with regard to flight operations with airborne radar.** *Institute of the Aeronautical Sciences, Preprint*, No. 582, 1956. 22 p. 4 figs., 29 refs. DWB (629.1308 I49p)—Recent progress in airborne radar observation of convective clouds is reviewed. The review covers the problems of instrumentation, severe turbulence, hail, icing conditions and terrain collision. The author suggests that weather radar sets should probably be modified so as to include antennas permitting vertical scanning. *Subject Headings: 1. Air-borne weather radar 2. Radar observation of convective clouds.—G.T.*

9H-8

551.501.81:551.55

Battan, Louis J. (*Dept. of Met., Chic. Univ.*), **Use of chaff for wind measurements.** *American Meteorological Society, Bulletin*, 39(5):258-260, May 1958. 4 figs., 2 refs. DWB, DLC. Also in: *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 333-337. 3 figs. DWB—The use of radar-reflecting chaff for making measurements of wind velocity and divergence is discussed. Data are presented to illustrate how the chaff technique can be used in studies of squall lines and jet streams. *Subject Headings: 1. Radar wind measurement 2. Chaff wind measurement techniques.—Author's abstract.*

9H-9

551.508.85

Bauer, S. J.; Robbiani, R. L. and Swingle, D. M., *Time integration of radar signals. Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 243-248. 8 refs. DWB—The problem of improving signal detectability has been the most important in weather radar. To decrease the minimum detectable signal a technique of signal integration is required. Photographic integration is found to be the most readily useable and effective means of improving signal detectability. *Subject Heading: 1. Radar scope photography.—N.N.*

9H-10

551.501.81:551.515:551.509.52

Bigler, Stuart G. (A. & M. College of Texas), *The use of composite radar photographs to identify severe storm-generating regions in squall lines. Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 135-142. 2 figs., 11 refs. DWB (M01.81 R124pc)—An attempt is made to relate severe local storms to the large scale distribution of radar echoes rather than to identify individual echoes, as has been the practice in the past. Two characteristics of the radar observation are related to severe storms to ascertain their usefulness in short range forecasting of severe weather. The number of storms analyzed so far is insufficient to permit a basis for definite conclusions, but the results indicate that radar observations may facilitate early determination of potentially critical areas of instability in which violent weather later breaks out. *Subject Headings: 1. Radar echoes from severe storms 2. Radar storm detection 3. Radar storm forecasting 4. Squall lines.—Author's abstract.*

9H-11

551.501.81:551.515

Blackmer, Roy H., Jr. (Illinois State Water Survey), *The use of radar data in mesometeorological analysis. Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 207-213. 3 figs., 7 refs. DWB (M01.81 R124pc)—Studies of small scale atmospheric disturbances are being made using data collected by the Thunderstorm Project in the vicinity of Wilmington, Ohio, during 1947. Radar data, when available, are being utilized in these studies. This paper discusses the use of space sections and time sections for studying the relationship between radar echoes and surface weather. Future research on the problem of determining surface weather from radar data is suggested. *Subject Headings: 1. Radar surface weather analysis 2. Atmospheric disturbances 3. Wilmington, Ohio.—Author's abstract.*

9H-12

551.5:061.6(744)

*§Blue Hill Meteorological Observatory, *Semi-annual Progress Report, 1954-1955 on Contract Cwb-8523*. April 29, 1955. 17 p. 4 figs., tables. typescript. Contents: Conover, John H., *Collection and processing of World Weather Records*, p. 3-7. Putnins, Pauls H., *Simple and easy method for presenting the change of stability of air masses*, p. 8-13. Conover, John H., *Spiral precipitation patterns in extratropical cyclones*, p. 14. Solar records, p. 15. *Current radar and other weather reports to East Boston*, p. 16-17. DWB—A table shows progress in receipt and processing of station records for World Weather Records. On June 30, 1954-207, on Jan. 10, 1955-433, and on April 26, 1955-535 records had been received and 65,186 and 359, respectively, prepared for printer. A total of 129 have not yet been received (48 of them from U.S.S.R.). Putnins' article presents a simple method for computing stability during 12 hours (on a + or - scale) between pressure levels from a RAOB and illustrates use of the method by computations for synoptic case of Jan. 5, 1952 (0300-1500z) when a pronounced occluding cyclone crossed Lake Erie. A continental cross section from Joliet, Ill., thru Buffalo to Nantucket and a stability change cross section (1000-400 mb) for the same section (with moisture lines also entered on cross section) are presented and discussed. The stability data and cross section show areas where vertical motions would be significant. Brief summary of work on spiral precipitation patterns tells of such observed in Dec. 21, 1954 snow-storm which covered 49,000 mi² with deep central circulation and little wind shear from radar beam to generating level at 20-25 thousand feet. On Jan. 13, 1955 a similar spiral pattern was observed. *Subject Headings: 1. World Weather Records 2. Stability index 3. Synoptic case histories 4. Cross sections 5. Spiral precipitation patterns 6. Radar precipitation observation 7. Solar radiation data 8. Blue Hill, Mass. I. Contract Cwb-8523 II. Boucher, Roland J. III. Wexler, Raymond IV. Brooks, Charles F. V. Conover, John H. VI. Putnins, Pauls H.—M.R.*

9H-13

551.501.81:551.509.31

Boucher, Roland J. (Harvard Univ., Blue Hill Met. Obs.), *Synoptic-dynamic implications of 1.25 cm vertical beam radar echoes. Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 179-188. 8 figs., 5 refs. DWB (M01.81 R124pc)—More than 1000 hrs of radar records taken with the APS-34 1.25 cm vertical beam radar during a four-year period have been readily classified into four clearly recognizable types. A limited number of precipitation growth mechanisms are thereby suggested and the echo types representing them are

shown to be well correlated to basically different classes of synoptic situations. A generalized echo cyclone model is derived. Maximum attainable hourly rates of precipitation are empirically related to the depth of detectable echo. Evidence is found of a slight relationship existing between the height of the warm front surface and that of the generating level above, with an average vertical distance between them of 12,000 ft. *Subject Headings: 1. Radar synoptic analysis 2. Precipitation mechanism.—Author's abstract.*

9H-14

551.501.81:551.515

*Brantley, James O., Jr. and Barczys, Daniel A. (both, Cornell Aeronautical Lab., Inc.), *Some weather observations with a continuous-wave Doppler radar. Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 297-306. 9 figs., 6 refs., 15 eqs. DWB (M01.81 R124pc)—This paper presents results of weather observations using a continuous-wave radar and hypothesizes simple models to explain the Doppler frequency spectra observed. Limited meteorological data are given and where possible these are compared with radar data. Spectra are given for drizzle, heavy rain, and snow under various wind conditions, and a method for determining rate of rainfall from Doppler information is suggested. Continuous-wave radar is shown to have limited utility for meteorological work and it is indicated that coherent pulsed Doppler radar would have greater applicability in weather research and storm warning. Speed discrimination capabilities of these radars make them particularly attractive for tornado detection. *Subject Headings: 1. Continuous wave Doppler radar 2. Radar observations 3. Radar tornado detection.—Authors' abstract.*

9H-15

551.590.25:551.501.81

Brysk, H.; Schensted, C. E.; Schensted, I. V. and Siegel, K. M. (all, Mich. Univ.), *Sections efficaces de radar des traînées météoriques. [Effective sections of meteor trains for radar.] L'Onde Électrique, Paris, 37 (362):520-522, May 1957. 10 refs., fig., eqs. DLC—The effective range of radar for the detection of meteor trains is determined theoretically, considering position, orientation and distance of the train, transmission power and electron density. *Subject Heading: 1. Radar echoes from meteor trails.—G.T.**

9H-16

551.511:551.577

Copeland, Robert C. and Hexter, Paul L., Jr. (both, Wea. Radar Research, M.I.T.), *The association of surface wind convergence with precipitation patterns. Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 189-199. 6 figs., 2 refs. DWB (M01.81 R124pc)—This paper represents an attempt to investigate the extent to which a spatial relationship exists between surface convergence and precipitation, and whether such surface convergence can contribute materially to the condensation for precipitation. The field of horizontal divergence of the surface wind in the New England area has been computed for several synoptic situations. A comparison with precipitation distribution as indicated by the radar PPI shows that for uniform air masses and cold front bands, showers tend to occur in regions of surface convergence, but not necessarily near localized areas of maximum convergence. The best relationship is obtained when the precipitation map is associated with a convergence pattern which precedes it by about 1 hr. In the case of the heavy rain associated with hurricane "Diane," 19 Aug. 1955, precipitation bands in southern New England appeared to be related to a well-defined region of surface convergence. Average rainfall rates over New England were computed from upper air data, and agreed well with averaged Weather Bureau hourly rainfall observations. In addition, intense surface convergence zones were found to produce increased vertical velocities of sufficient magnitude to account for the heavy localized rainfall. The results of a similar investigation of hurricane "Connie," 11 Aug. 1955, were less conclusive. *Subject Headings: 1. Surface convergence-precipitation relationships 2. Hurricane precipitation 3. Precipitation patterns.—Authors' abstract.*

9H-17

551.501.81:629.13

Copp, Martin R. and Walker, Walter G. (both, Langley Aeronautical Laboratory, Langley Field, Va.), *Analysis of operational airline data to show the effects of airborne weather radar on the gust loads and operating practices of twin-engine short-haul transport airplanes. U. S. National Advisory Committee for Aeronautics, Technical Note, 4129, Nov. 1957. 18 p. 3 figs., 3 tables, 13 refs., eq. DLC—Airspeed, altitude, and acceleration data were obtained from transports flown by one airline during Oct. 1955-May 1957 before and subsequent to the installation of airborne weather radar. A comparison of the results indicated that the magnitudes of the largest gust velocities and gust accelerations experienced for a given number of flight miles during radar operations were approximately 25% less than those experienced before the radar equipment was installed. *Subject Headings: 1. Air-borne weather radar 2. Gust measurement equipment.—Authors' abstract.**

9H-18

551.501.81:551.577

Donaldson, Ralph J., Jr., **Drop-size distribution, liquid water content, optical transmission and radar reflectivity in fog and drizzle.** *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 275-280. 5 figs., 16 eqs. DWB—A detailed investigation is reported which confirms earlier findings that radar measurements of liquid water content in fog yield consistently low values (despite application of various correction factors); true liquid water contents being 50% greater than the measured values. No explanation could be found for this discrepancy. *Subject Headings:* 1. Radar fog observations 2. Liquid water content measurements by radar.—G.T.

9H-19

551.501.81:551.515:551.578.1

Donaldson, Ralph J., Jr. (G.R.D., Air Force Camb. Res. Center), **Analysis of severe convective storms observed by radar.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 117-126. 11 figs., 6 refs. DWB (M01.81 R124pc). Also issued in *Journal of Meteorology*, 15(1):44-50, Feb. 1958. DWB, DLC—A survey of thunderstorms observed during 1956 by CPS-9 radar from Blue Hill (Milton, Mass.) revealed a high frequency of hail occurrence (as reported by a wide network of cooperative observers and the general public) in storms of high maximum height and high equivalent precipitation intensity of the associated radar echo. Approximate hail frequencies are deduced on the basis of these criteria. Echo height and precipitation intensity were also correlated in all convective storms. However, no relationship was found between hail size and the echo parameters because of the scarcity of data for large hail sizes. A detailed analysis is presented of the severe storms of June 1, 1956 which produced tornadoes and extensive wind damage and hail in western Massachusetts and southern Maine. These storms retained their identities up to six hours, permitting a sequence of radar measurements of maximum height and reflectivity. The Massachusetts tornado echo showed an equivalent precipitation intensity at 20,000 ft of 12 times that measured near the ground, just a few minutes before the tornado formed. A "tail" was also observed on the PPI. The periods of wind damage and hail commenced with a rapid growth in height of the echo top. Echo intensity gradients were also observed by contour mapping. *Subject Headings:* 1. Radar observation of thunderstorms 2. Hail frequencies 3. Radar observation of tornadoes 4. Milton, Mass.—Author's abstract.

9H-20

551.511:551.577.1.1

Douglas, R. H., **Convection in snow generating cells.** *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 295-300. 4 figs., 5 refs. DWB—Theoretical considerations lead to the conclusion that the latent heat of sublimation released by crystals as they grow in a moist stable environment is a significant source of energy for vertical development comparable to the observed cell heights, and for updrafts comparable to the terminal speeds of the snow particles themselves. The presence of supercooled water cloud inhibits the sublimational updraft, hence shear and turbulence (favorable to aggregation) may appear across a cloud boundary. The localized desiccation of stratiform water cloud offers a means whereby new internal cloud boundaries may be formed. The suggestion is offered that such boundaries may constitute the basis of the snow-generating cell as observed by radar. *Subject Headings:* 1. Convective cells 2. Snow formation.—From author's conclusions.

9H-21

551.508.85:621.396.9

East, T. W. R., **The elevation controller for CAPI operation of the AN/CPS-9 weather radar.** McGill Univ. Stormy Weather Research Group, Contract AF 19(604)-1579, Technical Note MWT-2, Oct. 1956. 12 p. fig., 2 charts, 2 tables, eqs.—The use of a Constant-Altitude Plan Indicator on a weather radar will require that the radar should scan a large volume expeditiously, according to some regular program. The Elevation Controller directs the radar antenna through this scanning program, and also controls the actions of the remainder of the CAPI display. The radar operator can take control of the antenna at will. Measurements showed that an early model of the Controller aimed the antenna within, at the worst, one-quarter degree of the required elevation angles. *Subject Heading:* 1. Radar equipment.—Author's abstract.

9H-22

551.508.85

East, T. W. R. and Dore, B. V. (both, Stormy Wea. Group, McGill Univ., Montreal), **An electronic constant-altitude display.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 325-330. 2 figs., 2 refs. DWB (M01.81 R124pc)—The electronic CAPI (constant-altitude position indicator) is designed for use with weather radars such as the AN/CPS-9. It displays, within a few minutes, the precipitation echoes received from all over a shallow layer at a fixed altitude. The system consists of four main sections: the Elevation Controller causes the radar to scan in the required manner and generally directs the remaining three sections, the Gating Circuits determine which information should be kept and which discarded, the

store retains the useful information in an electrostatic storage tube until it is complete and ready to be displayed, and the TV monitor displays the information as a bright, steady, constant-altitude plan picture. *Subject Heading: 1. Electronic constant-altitude position indicators (CAPI).—Authors' abstract.*

9H-23

551.501.81:523.51

Eshleman, V. R. and Mlodnosky, R. F., *Directional characteristics of meteor propagation derived from radar measurements. Institute of Radio Engineers, Proceedings*, 45(12):1715-1723, Dec. 1957. 11 figs., 17 refs., 5 eqs. **DLC**—The directivity of radio reflections from meteor trails and the distribution of trail orientations (radiants) control the directional properties of meteor propagation. Because of the geometrical correspondence between radar and oblique path detection of meteors, the directional properties of meteor propagation can be determined from the range and azimuth distributions of the echoes detected by a radar system. The gross features of these directional properties for an east-west path in northern temperate latitudes are such that (for maximum circuit duty cycle product of number of echoes and their average duration) the antenna beams at the transmitter and receiver should be pointed north of the great circle bearing during the morning hours and south of this bearing during the evening. The optimum off-path angle may vary from a few degrees to greater than 20°. For a north-south path, the beams should be pointed west of the path at night and east of the path during the day, for maximum duty cycle. These gross features appear to repeat each day. In addition, short-term fluctuations in the radiant distribution have been noted, some of these fluctuations presumably being due to heretofore undetected meteor showers of very short duration. It appears that the information capacity of meteor burst and ionospheric scatter communication systems could be markedly increased by varying the bearings of the antenna beams according to the known diurnal variations in meteor radiants. In addition, it may be possible to utilize the short-term fluctuations in the radiant distribution by means of a radar which can monitor continuously the changing radiant distribution and "instantaneously predict" the optimum antenna bearings for the communication circuit. *Subject Headings: 1. Radio reflections from meteor trails 2. Meteor shower radiants.—Authors' abstract.*

9H-24

551.501.81:551.557

*Ewing, R. A., *Use of radar as an economical means of obtaining upper wind data. New Zealand. Meteorological Service, Technical Note*, No. 111, March 19, 1954. 7 p. 3 tables. Attached, Addendum, No. 1, 1954. Figures for tables shown in the note. 1 p. **DWB**—The economics of wind finding by primary radar and light-weight balloon-borne reflectors are discussed. The performance figures for the type ME.7 radar used by the N. Z. Meteorological Service are quoted. It is concluded that the system can meet the needs of most services where temperature soundings are not required to accompany each upper wind measurement. *Subject Headings: 1. Radar upper air wind data 2. Upper air wind data.—Author's abstract.*

9H-25

551.501.81

Freeman, John C., Jr., *Small scale kinematics and dynamics of a frontal system. Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 131-133. 2 figs., eqs. **DWB**—This paper is a study of the changes in the field of radar echoes in Oklahoma, Arkansas and Missouri, Sept. 29-30, 1954. Equations are derived of the dynamics of the motion of convective type radar echoes. Diagrams show vector of a radar echo and effective coriolis parameter. *Subject Headings: 1. Radar analysis of frontal systems 2. Frontal movement.—N.N.*

9H-26

551.501.81:551.577

Gerhardt, J. R. and Tolbert, C. W. (both, *Electrical Eng. Res. Lab., Univ. of Texas*), *Rain attenuation and backscattering measurements at 4.3 millimeter wavelength. Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 243-252. 4 figs. **DWB** (M01.81 R124pc)—A discussion of one-way rain attenuation measurements made in late 1955 and the first half of 1956, using 4.3 mm equipment over a 1000 ft path, and by measuring both rainfall amount and drop size distribution using 7 gages distributed uniformly along the path and dye coated filter paper. Four of the gages were tipping bucket to be sensitive to .005 in. and 2 continuous recording wire gages sensitive to .001. A graph shows relation between measured and radar rates of precip. and drop size distribution; an artificial raindrop device giving uniform distribution along path is treated. *Subject Heading: 1. Radar analysis of rain.—M.R.*

9H-27

551.501.81:551.511:551.578.41

Gunn, K. L. S., *Snow studies with a zenith-pointing radar. Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 301-305. 5 figs., ref. **DWB**—A study of two months' height/time records of snow aloft over Montreal with a zenith-pointing radar is reported to show that there is often a characteristic sequence of echoes. At the beginning of a

storm, wispy echoes of small vertical extent are observed; the echoes develop a greater depth over the next few hours, the bottom lowering gradually to the ground. Often the air in the lower levels is dry and the bottom edge of the echo during this stage has a characteristic pattern of pendulous extensions, or stalactites. The middle part of a storm is characterized by a cell-and-trail pattern with the lower 5 to 10,000 ft more or less uniform, patternless echo, presumably due to the merging of several trails at the lower levels. In the last part of the storm, no trails are seen, and the top of the uniform echo gradually subsides with time. This rather uniform low level echo at the end of a storm may possibly be due to a new mechanism generating snow at lower levels, or simply to the precipitation intensity becoming weaker and the maximum detectable height of echo falling off with time. *Subject Headings: 1. Snow formation 2. Radar analysis of precipitation.—Author's introduction.*

9H-28

551.501.81:551.578.41

Gunn, K. L. S. and Marshall, J. S. (*both, Stormy Weather Group, McGill Univ., Montreal*), The distribution with size of aggregate snowflakes. McGill Univ. MacDonald Physics Lab., Contract AF 19 (122)-217, Scientific Report MW-20, Sept. 1956. p. 9-32. 15 figs., 2 tables, 21 refs. Also in *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 37-41. 5 figs., 12 refs. DWB (M01.81 R124pc)—Average size distributions for aggregate snowflakes are well represented above $D = 1$ mm by $N_D = N_0 e^{-\Lambda D}$, where D is the diameter of the water drop to which the aggregate would melt. This is the same equation that MARSHALL and PALMER (1948) reported for rain, but for rain $N_0 = 8.0 \times 10^3 \text{ m}^{-3} \text{ mm}^{-1}$ and $\Lambda = 41 R^{-0.21}$ while for snow $N_0 = 3.8 \times 10^4 R^{-0.87} \text{ m}^{-3} \text{ mm}^{-1}$ and $\Lambda = 25.5 R^{-0.48}$, where R is millimeters of water per hour. The sum of the sixth power of the (melted) particle diameters in unit volume (Z), the mass of snow in unit volume (M), and the precipitation rate (R) are found to be related by $Z = 9.57 \times 10^{-3} M^{2.2}$, with Z in $\text{mm}^6 \text{ m}^{-3}$, M in mgm m^{-3} and R in mm hr^{-1} of water. The relation $Z = 2000 R^{2.0}$ is in good agreement with $Z = 2150 R^{1.8}$, an average locus through recently reported Japanese data for aggregate flakes. The relation $Z = 200 R^{1.2}$ for snow, published earlier by the present authors is thought to be in error due to the method of sampling used at that time. Comparing standard rain and melted snow distributions of the same R requires that there be considerable break-up of the larger particles when snow turns to rain at the melting level. Further, to explain the observed radar signal increase from the rain over that from the snow, a considerable increase in R at or below the melting level is required. *Subject Headings: 1. Snowflake size distribution 2. Radar analysis of precipitation 3. Radar analysis of snow.—Authors' abstract.*

9H-29

551.501.81:551.576

Harper, W. G. (*Met. Office, London*); Ludlam, F. H. and Saunders, P. M. (*both, Imperial College, London*), Radar echoes from cumulus clouds. *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 267-272. 6 figs., 3 refs. DWB (M01.81 R124pc)—During carefully coordinated investigations of developing shower clouds by visual and radar methods, radar echoes were observed from cumulus not containing precipitation. These echoes are of a kind not previously described. We call them 'mantle' echoes, and in this paper report some of their characteristics. We add observations of radar 'angels' observed in convective weather, often in association with cumulus clouds. *Subject Headings: 1. Radar echoes from cumulus clouds 2. Radar "mantle" echoes 3. Radar observation of angels.—Authors' abstract.*

9H-30

551.501.81:551.557

Harris, K. E. (*Dir. of Development, A. C. Cossar, Ltd.*), Secondary radar applications. *Communications and Electronics*, London, 1(3):57-61, Dec. 1954. photos, diagr., table. DWB—The various uses for radar are outlined and secondary uses such as for upper air wind measurement emphasized. Illustrations of use of Mullard Radar Sonde System including diagram of complete radar wind, radar sonde and ground station equipment are presented, with specifications listed. *Subject Heading: 1. Radar wind measurement.—M.R.*

9H-31

551.501.81:551.590.25

Hawkins, G. S. and Winter, D. F. (*both, Harvard College Obs.*), Radar echoes from overdense meteor trails under conditions of severe diffusion. *Institute of Radio Engineers, N. Y., Proceedings*, 45(9):1290-1291, Sept. 1957. 2 figs., 13 eqs. DLC—Formulas are derived and a nomogram presented for computing radar cross section of diffuse meteor trails when $V = 10$ to 100 km/sec , $\lambda = 0.1$ to 10 m , $h = 70$ to 120 km and the electron density is $<$ or $> n_c$ or the critical density. The number of ions per unit length in the column (q) [the initial diameter (r_0) of the trail is ignored; the Lovell-Clegg scattering formula applies only when $\lambda > 2 \text{ m}$] and the diffusion coefficient (D) are also factors which are considered. *Subject Headings: 1. Radar echoes from meteor trails 2. Meteor trails.—M.R.*

9H-32

551.501.81:551.594.22

Hewitt, F. J. (*Natl. Telecommunications Res. Lab., Johannesburg, S. Africa*), **Radar echoes from inter-stroke processes in lightning.** *Physical Society of London, Proceedings*, Section B, 70(10):961-79, Oct. 1, 1957. 14 figs., 14 refs. **DLC**—From radar observations of inter-stroke lightning processes made over a wavelength of 5.0 cm, information is derived on height limits, horizontal extent, densities and reflecting properties of inter-stroke junction streamer activity. The results are presented in graphs and sample records and discussed in detail. *Subject Heading: 1. Radar echoes from lightning.*—G.T.

9H-33

551.501.81:551.577

Hiser, Homer W., **Some interesting radar observations at the University of Miami.** *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 287-293. 3 figs. **DWB**—The phenomena whose radar scope photographs are presented and discussed include: a) smoke plumes, b) precipitation, c) comparative echoes obtained with various pulse lengths and d) intersecting squall lines. *Subject Headings: 1. Radar echoes from smoke 2. Radar precipitation echoes 3. Radar squall line detection 4. Miami, Fla.*—G.T.

9H-34

551.501.81:551.515:621.396.029

Hiser, Homer W. (*Marine Lab., Univ. of Miami*), **Comparisons between a 10-CM and a 5-CM wavelength radar for meteorological purposes.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 253-259. 3 figs., table, 4 eqs. **DWB** (M01.81 R124pc)—Comparison PPI and RHI photographs have been taken on a 10-cm and on a 5-cm wavelength radar during a one-year period at the University of Miami. Both radars have approximately three and one-half degree conical beams, but differ in pulse lengths and peak power transmitted. The two radars have been compared with respect to their detection capabilities, attenuation limitations, and propagation characteristics. The low powered 5-cm wavelength radar appears very favorable except for attenuation in heavy rain. The 10-cm wavelength radar consistently shows a greater amount of anomalous propagation than the 5-cm. Preliminary results indicate that a 5-cm wavelength, medium powered, narrow beamed radar with about a 5-microsecond pulse length would be quite satisfactory for long range detection and general meteorological use in areas where an extensive coverage of intense echoes does not ordinarily occur. However, a high powered 10-cm radar is recommended for rainfall measurement and other quantitative work where large intense echoes are involved. *Subject Headings: 1. Radar wave lengths 2. Atmospheric attenuation 3. Radar storm detection 4. Radar precipitation echoes.*—Author's abstract.

9H-35

551.508.85:551.515

Hiser, Homer W.; Freseman, W. L. and Stephens, F. H., **Radar meteorological studies, July 1, 1956-June 30, 1957.** Miami, Univ. of (Coral Gables, Fla.). Marine Lab. and Radar Research Lab. Contract NOas 55-620-d, (Report) 57-16, Final Report, July 1957. 62 p. 16 figs., 20 refs., 4 eqs.—Several equipment modifications and developments are described, including a stepped video inversion type of isoecho contour device for the SP-1M radar and a new low-noise preamplifier which has greatly improved the performance of this radar. A listing and discussion of suggested radar parameters, devices, and associated equipment for meteorological use is also included. Comparisons of characteristics and weather detection capabilities are made between the 10-cm SP-1M and the 5-cm wavelength MPS-4 radars. Special severe storm studies are presented. Differences in the amount of anomalous propagation observed on radars of different wavelength are shown. Equations are presented which describe the spiral precipitation bands in hurricanes as observed on radar and give their relation to the storm center. Some rules and suggestions for identification and estimation of the intensity of severe storms are also presented. *Subject Headings: 1. Radar meteorology 2. Severe storm studies 3. Radar weather equipment 4. Radar photography of squalls.*—Authors' abstract.

9H-36

551.508.85

Hitschfeld, Walter, **Summer program at Montreal.** *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 141-144. 2 figs. **DWB**—The Stormy Weather Group of McGill University uses polaroid pictures of PPI scopes as an aid to radar echo analysis. A small inexpensive facsimile transmission system is used for the distribution of the polaroid pictures. *Subject Heading: 1. Radar scope photography.*—N.N.

9H-37

551.501.81:551.578.7

Hitschfeld, Walter (*Stormy Wea. Group, McGill Univ., Montreal*), **Three-dimensional radar patterns related to surface hail reports.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 107-116. 6 figs. **DWB** (M01.81 R124pc)—Five hundred

reports on the time and place of hail occurrences within 100 mi of Montreal, and information on the size of the hail stones, were received on 44 days in the summer 1956. The hail information on nineteen of these days is plentiful enough to warrant more detailed study, and comparison with the constant-altitude radar weather maps prepared by a special technique from the records of the CPS-9 weather radar at Montreal Airport. Examples of constant-altitude records for four days of thunderstorms with hail are shown. When the air aloft is moist, the shower echoes are generally accompanied by large, tenuous "plumes," which are believed to consist of snow formed aloft near the storm cores. When thrown clear of the cores, the plumes rapidly separate from them and spread out due to wind shear. The hail falling from the large echoes accompanied by plumes is generally small, and often "soft." On one occasion large, destructive hail fell from small, finger-like, intense echoes, developing to medium heights, without plumes, in an atmosphere very dry aloft. An estimate based on the reports received, of the area covered by hail yields a hail-frequency of 0.6 in good agreement with the point-statistic of 0.7 hail falls per summer at Montreal. *Subject Headings:* 1. Radar echoes from hail 2. Hail stone size 3. Hail frequencies 4. Montreal, Quebec.—*Author's abstract.*

9H-38

551.501.81:551.515.8

Hoecker, Walter H., Jr. (U. S. W. B.), Abilene, Texas, area tornadoes and associated radar echoes of May 27, 1956. *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1956. Proceedings*, pub. 1957. p. 143-150. 7 figs., 7 refs. DWB (M01.81 R124pc)—A disturbance revealed as a single precipitation echo 85 mi northwest of Abilene, Tex., on the afternoon of May 27, 1956, developed into a relatively large thunderstorm group, is revealed via the radar scope presentation. It is possible to associate specific portions of the radar echoes with several of the tornadoes. For several hours the storm echoes moved to the right of the wind field in which they were apparently imbedded and for over an hour exhibited cyclonic motion. *Subject Headings:* 1. Radar tornado detection 2. Radar echoes from tornadoes 3. Tornado, Abilene, Texas (May 1956) 4. Abilene, Tex.—*Author's abstract.*

9H-39

551.501.81:551.57

Huff, F. A. and Stout, G. E., Precipitation and cloud detection with CPS-9. *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 135-140. 4 tables. DWB—The Illinois Water Survey made a study of the detection capabilities of the high-powered 3 cm CPS-9 set in 1954-1955. Different types of precipitation were investigated. A study was made of echoes with or without precipitation and of precipitation without echoes. Tabulated results appear to show that the CPS-9 is an excellent detector of all rainfall within 75 mi. *Subject Headings:* 1. Radar precipitation observation 2. Radar cloud detection.—N.N.

9H-40

551.501.81:551.508.85:551.57

Illinois. State Water Survey. Meteorologic Laboratory, Research study on intensity of surface precipitation using radar instrumentation. Contract DA-36-039-Sc-42446, 6th Quarterly Technical Report, Aug. 1-Oct. 31, 1953. 18 p. 2 tables, eqs. Also: 8th, 9th, and 10th Quarterly Technical Reports, Feb. 1-Oct. 31, 1954. each about 15 p. figs., tables, eqs. DWB (M01.81 I294)—Installation, operation and maintenance of APS-15, TPS-10 and AN/CPS-9 (XE-2) radar sets during these four report periods are described as well as the use of an area integrator, rain gage drop-size camera and other equipment. Routine measurements and results of the analysis of data are discussed. *Subject Headings:* 1. Radar analysis of precipitation 2. Radar rainfall measurements 3. Area precipitation integrator 4. Drop size measurements. I. Neill, J. C. II. Farnsworth, G. W. III. Jones, D. M. A. IV. Stout, G. E.—G.T.

9H-41

551.501.81:551.57

Illinois. State Water Survey. Meteorologic Lab. at Illinois Univ., Study on intensity of surface precipitation using radar instrumentation. Contract DA-36-039-SC-64723, Project DA-3-99-07-022, 5th to 10th Quarterly Technical Reports, July 1, 1956-Dec. 31, 1957. each about 8 p. figs., tables, refs., eqs. DWB (M01.81 I291)—Routine operation of CPS-9 and TPS-10 equipment and area integrator is reported, as well as a study of attenuation from drop size measurements, and completion of an automatic attenuation device. Results of data analyses are presented. (For more detailed abstract on 7th Report, see 8.10-90, Oct. 1957, MAB.) *Subject Headings:* 1. Area precipitation integrator 2. Radar analysis of precipitation 3. Drop size measurements 4. Illinois. I. Mueller, E. A. II. Schuetz, J.—G.T.

9H-42

551.501.8:551.508.8

Johns, Paul, The usefulness of radar in a meteorological office. *Canada. Meteorological Division, Cir.*, 2812, Aug. 17, 1956. 6 p. DLC—Summary of uses of radar in synoptic analysis forecasting and briefing of pilots is based on 5 years of experience with CPS-9 equipment at Dorval

ses include filling in details on the weather map where network is sparse, more precise information concerning turbulence, cloud tops or convective cells, freezing levels, rain areas, frontal structure, low, etc. Experience in interpretation of echoes is vital for proper reporting. A Model-41 Decca weather radar is to be installed by the Canadian Meteorological Division at the Malton Forecast Office. *Subject Headings:* 1. Radar weather analysis 2. Decca weather radar Model-41 3. Montreal, Quebec 4. Malton, Ontario.—*M.R.*

9H-43

551.508.85

Jones, R. F. (*Met. Office, London*), *Weather-radar research in the Meteorological Office. Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 359-367. 2 refs. DWB (M01.81 R124pc)—A brief review of the radar equipment available in the Meteorological Office for research purposes and as an aid to forecasting is given, together with the lines along which research is likely to proceed during the next few years. *Subject Headings:* 1. Radar meteorology research 2. Radar equipment 3. Great Britain Meteorological Office.—*Author's abstract.*

9H-44

551.501.9 551.509.52:551.515.3

McGill, William L. (*State Co-ordinator, Defense and Disaster Relief of Texas*), *How a state prepares for disaster. American Academy of Political and Social Science, Annals*, 309:89-97, Jan. 1957. 17 foot-refs. DWB—Article claims Texas holds first place with respect to all major disasters: first in floods and tornadoes, second in hurricanes. Operational structure, financing relief activities, preparedness, warning network (radar storm warning network of U. S. W. B. and State Highway patrol with aid of U. S. A. F. and Ground Observer Corps), training, public information program, federal aid, drought and emergency aid, emergency wind erosion control program, water and soil conservation measures and other phases of Texas disaster program are described. *Subject Headings:* 1. Disaster warning networks 2. Tornado warning networks 3. Texas.—*M.R.*

9H-45

551.501.81:37

Massachusetts Institute of Technology. [Radar Meteorology Course Notes, used in the 1955 summer session. Lectures by Austin, Atlas, Bemis, Stone, Fleisher, Marshall, etc.] Each lecture pagged. figs. (incl. photos), refs., eqs. Mimeo. DWB (M01.81 M414wr)—A thorough course in the theory of propagation of electromagnetic radiation in the atmosphere, polarization, scattering and absorption by atmosphere and precipitation (J. M. AUSTIN); weather echo fluctuation notes (BEMIS); radar signal intensity measurements (STONE); precipitation patterns (ATLAS); cloud detection by radar (ATLAS); radar for severe storm detection and research (thunderstorms, tornadoes and hurricanes, lightning, turbulence) (ATLAS and BEMIS); effect of particle shape and snow, hail or ice grains (FLEISHER); lightning and angels, statistics of weather echoes, snow mechanisms, measurement of precipitation rates (J. S. MARSHALL) and pulsed radar. A great deal of information is given in the form of tables, graphs, diagrams, photographs of PPI and RHI scopes, etc. *Subject Headings:* 1. Radar meteorology courses 2. Radar weather research. I. Marshall, J. S. II. Austin, Pauline III. Atlas, D. IV. Bemis, A. C. V. Stone, Melvin L. VI. Fleisher, Aaron.—*M.R.*

9H-46

551.501.81:551.515.2:061.6

Massachusetts Institute of Technology. Dept. of Meteorology, *Weather radar research. Contract DA-36-039-SC-42625, Final Report*, March 15, 1955. 16 p. DWB—During the two years covered by this report one tornado (Worcester, Mass.) and 2 hurricanes were observed and results analyzed. Precip. patterns in the New England hurricanes did not conform to the usual tropical hurricane pattern. Higher accuracies were obtained in measurements made using different types and degrees of radar polarization beginning late in 1953. Thirty-four papers and reports issued by personnel working on this contract are listed. *Subject Heading:* 1. Radar precipitation studies.—*M.R.*

9H-47

551.501.81:551.515

Massachusetts Institute of Technology. Dept. of Meteorology, *Weather radar research. Contract DA-36-039-SC-64472, Project DA-3-99-07-022, Quarterly Technical Reports No. 1 to 3, March 1-Nov. 30, 1955.* about 11 p. each. figs. Also: *Final Report*, reviewing the Project from March 1, 1955 through Feb. 29, 1956. March 15, 1956. 21 p. 3 figs. DWB (M01.81 M414wac)—Three weather radars were used during the year covered by these reports, to investigate rain and snow occurring in all of the major storms affecting the vicinity. Instrumentation, observations and some of the results are reported in the Final Report. Studies included applications to synoptic meteorology, precipitation physics, and turbulence. Publications, lectures, research reports and notes emanating from this contract are listed (Final Report, p. 5-7). *Subject Headings:* 1. Radar meteorology research. I. Austin, Pauline M.—*M.R.*

9H-48

551.501.81:551.515.2(74)

Massachusetts Institute of Technology. Dept. of Meteorology. **Weather Radar Research**. Contract DA-36-039 SC-71136, Quarterly Technical Report, No. 2, Sept. 15, 1956. 13 p. fig. **DWB** (M01.81)—Analyses of a few cases were made and one example (Aug. 19, 1955) cited as illustrated to show precip. pattern over Massachusetts compared with radar echo pattern as divergence field over New England during Hurricane "Diane", 1955. *Subject Headings*: 1. Radar precipitation echoes 2. Hurricane "Diane" (1955) 3. Massachusetts.—M.R.

9H-49

551.501.81:551.5

Massachusetts Institute of Technology. Dept. of Meteorology, **Weather Radar Research**. Contract DA-36-039-Sc-71136, Quarterly Technical Reports, No. 4 to 6, March 15, June 15, Sept. 15, 1957. each about 12 p. figs. Also: Final Report, Reviewing the Project March 1, 1958. Nov. 30, 1957. issued Dec. 31, 1957. 21 p. 2 figs. Appendix: Complete list of technical and research reports. **DWB** (M01.81 M414rad)—Reports on progress in application of radar to synoptic analysis (location of warm fronts), precipitation physics, turbulence and small-scale atmospheric circulation with special reference to construction of an integrating circuit to be used with the rain correction and iso-echo contouring unit, and modification of the variable polarization radar, etc. *Subject Headings*: 1. Radar meteorology research. I. Austin, Pauline M.—M.R.

9H-50

551.501.81:551.578.11 551.508.79:551.578.11

Imai, I.; Fujiwara, M.; Ichimura, I. and Yoshihara, Z., **On the radar reflectivity and the drop size distribution of rain**. *Journal of Meteorological Research*, Tokyo, 7(7):422-433, Oct. 1957. 17 figs., 21 refs., 9 eqs. In Japanese; English summary p. 422. **DWB**—Concurrently with the measurements of radar receiving power, continuous observations of raindrop size distributions were made in summer of 1954 at three locations about 20 km WNW of the radar site. Automatic raindrop samplers were used, in which a roll of filter paper is unrolled and passed beneath an opening for sampling and then scrolled up round a motor-driven cylinder. Before use, the filter paper is immersed in gasoline, in which finely ground powder of water blue dye is suspended, and then dried well. From the observed size distribution of every minute, radar reflectivity factor (Z) and rainfall intensity (R) were computed. $Z-R$ relationships were determined for two rainstorms, assuming $Z \propto R^{1.6}$. The results are as follows:

July 28 rain: $Z = 240 R^{1.6}$, Aug. 18/19 rain: $Z = 120 R^{1.6}$.

The disagreement between the two coefficients in the relations shown above may presumably be due to a systematic difference in the drop-size distribution of these two rainfalls. The July 28 rain was of a relatively continuous type, whereas the Aug. 18/19 rain was of a purely showery nature occurring in the outer region of typhoon "Grace." For Aug. 18 rainfall, some analyses of observed drop-size distributions were attempted. Except for certain differences in numerical parameters and for minute details of curves, the observed distributions fit the Marshall-Palmer type qualitatively. *Subject Headings*: 1. Radar echoes from rain 2. Drop size distribution 3. Drop size meters.—*Authors' abstract*.

9H-51

551.501.8

Imai, Ichiro (*Met. Research Inst., Tokyo*), **Weather radar network in Japan**. *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 341-345. 5 figs., table, 6 refs. **DWB** (M01.81 R124pc)—The main characteristics of the four weather radars which are installed in Japan, the method of radar observation and its information, and the utilization of radar in forecasts and in other fields are briefly reviewed. *Subject Headings*: 1. Radar network 2. Radar observation 3. Japan.—*Author's abstract*.

9H-52

551.501.81:061.3

Imai, Ichiro (*Met. Research Inst., Tokyo*), **Researches in radar meteorology at the Meteorological Research Institute**. *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 347-356. 12 figs., 18 refs. **DWB** (M01.81 R124pc)—Researches in radar meteorology, which have been made so far at the Meteorological Research Institute, are reviewed. Results of radar-echo analyses, size-distribution observations, echo-power measurements, and instrumental developments are briefly described. *Subject Headings*: 1. Radar meteorology 2. Meteorological research institutes.—*Author's abstract*.

9H-53

551.501.8

Index of weather radar organizations. 1957? 10 p. Pt. 1, U. S. Govt. Agencies. Pt. 2, Universities (U. S.). Pt. 3, Industrial agencies (U. S.). Pt. 4, Foreign organizations. Mimeo. **DWB** (M01.81 I38)—Thirty-five outfits in the U. S. and abroad that maintain radar weather activities

es of equipment, type of research or activity, and chief radar personnel, are listed under the
vt. Agency, University, Industrial Agency or Foreign (Belgium, U.K. and Canada) Agency.
Subject Headings: 1. Radar weather organizations 2. Institution indexes.—M.R.

9H-54 551.508.85
Installation of weather radar type AN/CPS-9. *Indian Journal of Meteorology and Geophysics*,
w Delhi, 9(1):75-76, Jan. 1958. fig. DWB, DLC—A weather radar type AN/CPS-9 was
talled in Sept. 1957 near Safdarjung Airport, New Delhi. A photograph showing the 75 ft steel
ver upon which the main display unit is mounted, is presented. The radar operates on a frequency
9317 Mc/s and has a peak power output of 75 KW with a maximum range of 400 mi. Subject
adings: 1. Radar equipment 2. New Delhi, India.—I.L.D.

9H-55 551.508.85
Jay, Lee A. (Met. Dept., Army Electronic Proving Ground), Weather radar instrumentation
the Army Electronic Proving Ground. *Weather Radar Conference, 6th, Cambridge, Mass., March*
8-28, 1957, *Proceedings*, pub. 1957. p. 369-372. DWB (M01.81 R124pc)—The Meteorology
partment of the Army Electronic Proving Ground (AEPG) has designed and procured two
pecial weather surveillance radars and is mounting them in mobile vans to test the feasibility of
ng such equipment. The forecasters will utilize present weather and mesometeorological scale
ecasts in selecting sites for the units. It is believed that mobile radars will be extremely valuable
mountainous terrain for storm warning and of equal value for close range study of thunderstorms.
he basic test data may also be analyzed later for future study of other weather phenomena, including
ractive index, detection of inversions, fall velocity of precipitation and attenuation. Subject
adings: 1. Radar weather instrumentation 2. Mobile radar units.—Author's abstract.

9H-56 551.501.81:551.578.11
Jones, Douglas M. A., 3-cm and 10-cm wavelength radiation back scatter from rain. *Weather*
adar Conference, Sept. 1955, *Proceedings of the Fifth . . . Conference*, pub. 1956. p. 281-285.
., 6 refs. DLC—During 1953 and 1954, 1270 photographic observations were made from 49
orms for an analysis of drop-size distribution. The rainfall rate, R, and the radar back scattering,
were then calculated from this distribution. A comparison of Z-R relationships shows a tendency
Z to deviate toward highest values at high rainfall rates. Nonsphericity of large drops of rain
important in increasing the backscatter. Subject Headings: 1. Radar analysis of rain 2. Rain-
op shape.—N.N.

9H-57 551.501.81:551.578.11
Jones, Douglas M. A. (Illinois State Water Survey), Shapes of raindrops. *Weather Radar*
onference, 6th, Cambridge, Mass., March 26-28, 1957, *Proceedings*, pub. 1957. p. 1-7. 5 figs.,
ble, 8 refs. DWB (M01.81 R124pc)—A method of measuring raindrops 2.0 mm and larger in
ree dimensions is described. The results of measurements made on raindrops photographed
uring 1956 are described. Comparison with laboratory and theoretical investigations are made.
Subject Headings: 1. Radar raindrop measurement 2. Raindrop size measurement.—Author's
stract.

9H-58 551.501.81:551.577.11
Kodaira, N., Radar rainfall measurement. *Journal of Meteorological Research*, Tokyo, 7(7):434-
8, Oct. 1955. 5 figs., 2 tables, 3 refs., 6 eqs. In Japanese; English summary p. 434. DWB—
he three point-rainfalls were measured on July 28 and Aug. 18, 19, 1954 by 3.2 cm meteorological
dar with correcting for their attenuation and compared with the rain gage observation. The
rrection factor F was about $\frac{1}{2}$. The reflectivity factor Z was measured by rain drop meter at the
me time it was about 250 $R^{1.6}$ (July) and 120 $R^{1.6}$ (Aug.). Subject Headings: 1. Radar rainfall
easurement 2. Rain gages.—Author's abstract.

9H-59 551.508.85
Kodaira, Nobuhiko (Weather Radar Res., M.I.T.), An iso-echo contouring device. *Weather*
adar Conference, 6th, Cambridge, Mass., March 26-28, 1957, *Proceedings*, pub. 1957. p. 307-314.
figs., tables, 3 refs., 3 eqs. DWB (M01.81 R124pc)—This paper describes the equipment whose
urpose is to indicate iso-echo contours on the PPI using range-corrected and averaged video signals.
ange correction is accomplished by adding logarithmic video and range signals. This range cor-
cted video signal can be present on the PPI after passing through a leveling and shaping circuit.
owever, there is considerable fuzziness in the contours and several decibels difference between
e indicated intensity and the mean value measured by the Pulse Integrator. To improve this,
e fluctuating signals must be integrated for an interval a little smaller than the period in which
e antenna rotates through the beam width. A solid delay line of 1/p.r.f. will be used for averaging

video signals. Approximately 50 sweeps will be averaged. *Subject Headings: 1. Iso-echo contouring devices 2. Radar signal intensity.—Author's abstract.*

9H-60

551.501.81:551.51

Langleben, M. P., **Synthesis of constant-altitude PPI's.** *Weather Radar Conference, Sept. 1956. Proceedings of the Fifth . . . Conference*, pub. 1956. p. 187-192. 6 figs., 5 refs. DWB—Snow particles fall through some wind field and consequently the shape of a precipitation trail is related to this field. The slope of such trails indicates the fall velocities of such precipitation particles. Charts show lines of constant altitude plotted against range; line arrays on March 4, 1955 at scattered cells at the generating level. *Subject Heading: 1. Radar analysis of precipitation.—N.M.*

9H-61

551.501.81

Langleben, M. P. and Gaherty, W. Denis, **Optical system for automatic synthesis of constant-altitude radar maps.** McGill Univ. MacDonald Physics Lab. Stormy Weather Research Group. Contract AF 19(122)-217, Technical Report MWT-3, Jan. 1957. 16 p. 10 figs., 2 refs. DWB? The theory leading to the technique of generating constant-altitude radar maps from a series of PPI photographs taken at successively increasing elevation angle is outlined. This is along the line already described in MW-24 (see 8.5-256, May 1957, MAB). The design of an optical system to achieve such syntheses is then described and followed by a discussion of the components of the synthesizer in use at the present time, their functions and modifications that are foreseen. The system produces good pictures and has been fairly trouble-free in operation. *Subject Heading: 1. Constant altitude radar maps.—Authors' abstract.*

9H-62

551.501.81:551.578-

Langleben, M. P. (Stormy Weather Group, McGill Univ., Montreal), **Snow pattern revealed by constant-altitude maps.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957. Proceedings*, pub. 1957. p. 89-98. 4 figs. DWB (M01.81 R124pc)—Radar records for 320 hrs of precipitation echoes in the winter 1955-56 have been synthesized as sets of constant-altitude maps of 75 mi radius and at height intervals of 2000 ft. These include detailed coverage of 13 storm and portions of others. During the 320 hrs sampled the pattern aloft consisted of diffuse nebulous echo for 152 hrs; of narrow line streaks for 120 hrs; of firm, discrete cells either scattered or in line arrays and clumps for 111 hrs; and of firm patches of echo for 71 hrs. *Subject Headings: 1. Radar echoes from snow 2. Radar analysis of snow.—Author's abstract.*

9H-63

551.501.81:551.51

Leach, Wayne (A. & M. College of Texas), **Observed characteristics of convective cell bands.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957. Proceedings*, pub. 1957. p. 151-156. fig., 10 refs. DWB (M01.81 R124pc)—Certain identifiable features of convective cell bands on radar are discussed as to their appearance, characteristics, and interpretation. The "thin band" or precursor line, the "cell band" or line of convective precipitation echoes, and the "trail band" which usually appears as an area of heavy stratiform type echoes behind the cell band, are considered and an analysis presented based primarily on meso-scale synoptic studies. *Subject Headings: 1. Convective cell bands 2. Radar echoes.—Author's abstract.*

9H-64

551.501.8:551.510.0

Leasure, Richard B.; Durham, K. S.; Tobias, J. J. and Dudrow, R. A., **Radar detection of angel activity with corresponding refractometer soundings.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957. Proceedings*, pub. 1957. p. 261-266. 3+figs., 3 refs. DWB (M01.81 R124pc)—Some interesting observations of "angel" type activity were made on May 2 and 3, 1955 utilizing an 0.86 cm vertically pointed radar set. Observations were made by personnel of the Meteorological Radar Section of the Aerial Reconnaissance Laboratory, Wright Air Development Center. At approximately the same time, vertical refractometer soundings were made by the Wave Propagation Section of the same laboratory. Photo recordings of the "angel" activity are shown with corresponding radiosonde and refractometer traces. In addition, several interesting and unusual slides on other "angel" activity are shown. Radiosonde and refractometer data will not be considered for this portion of the paper. *Subject Headings: 1. Radar angels 2. Refractometer observations 3. Radar observation of angels.—Authors' abstract.*

9H-65

551.508.85:551.55

Lhermitte, R., **Transpondeur radar pour la mesure du vent.** [Transponder type radar for the measurement of wind.] *Journal Scientifique de la Météorologie*, Paris, 6(24):123-131, Oct./Dec. 1954. 3 figs. (incl. photos), 4 refs. French, English and Spanish summaries p. 123. DWB—A transponder is described and illustrated for use in determining upper air winds from Weather Ships

The equipment replaces the "target" type of system whereby a radar reflection from the balloon is used to determine the position in height and distance of the balloon as it ascends. The radar signal received by the transponder on 220 Mc/sec frequency reverts at 180 Mc/sec and permits one to obtain a much more stable signal and from a greater distance (100-130 km). A signal controlled baroswitch enables direct determination of height from pressure. The transponder consists of two tubes, the baroswitch, condensers, modulator, antenna and wiring as illustrated. *Subject Headings: 1. Radar wind measurement 2. Transponders 3. Radarsondes.—M.R.*

9H-66

551.501.81:551.577

Lhermitte, Roger (*Magny-les-Hameaux Obs., France*), *Display of precipitation echo contours. Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings Supplement, p. 1957. p. 23-27. 2 figs. DWB (M01.81 R124pc)*—In this work, precipitation echoes are recorded by successive pictures taken with different echo intensities and with the aid of a special device which reproduces only the edges of the echoes. Thus we obtain a sort of isoline whose thickness is a function of both the signal fluctuations and the intensity gradient. The obvious advantage of the presentation of a number of echo intensity levels on the same picture has led the author to add to the preceding system an automatic and continuous commutation of each of the several levels. The interposition of a colored filter with a different color for each of the selected levels and the use of Kodachrome photography provide an ideal display. In this paper the simple system used for this purpose is described. The selected colors are: Red for the weakest level; Blue+Red for the intermediate level; Blue+Red+Green=White for the highest level. *Subject Headings: Radar precipitation echo intensities 2. Iso-echo contour devices.—Author's abstract.*

9H-67

551.501.81:551.577.11

Lhermitte, Roger, *Sur une méthode d'observation de l'intensité des échos de pluie.* [A method of observing the intensity of precipitation echoes.] *Académie des Sciences, Paris, Comptes Rendus, (24):2955-2957, June 12, 1957. fig., ref. DLC*—On the basis of a difference in fluctuations observed in weak and in intense precipitation echoes, an apparatus was developed which automatically blots out areas of intense precipitation. Thus within the white precipitation echoes on the radar screen the areas of intense precipitation appear as dark spots. Sample radar screen photographs are presented. *Subject Headings: 1. Radar precipitation echo intensities 2. Radar echo obliteration apparatus.—G.T.*

9H-68

551.501.81:551.577

Ligda, Myron G. H., *Influence of radar characteristics and siting on the detection of precipitation. Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference, pub. 1956. p. 89-94. 3 figs. DWB*—The author discusses various factors affecting radar observations and the resulting lack of agreement between reports from two or more stations observing the same phenomenon. These factors are: 1) difference in radar type, 2) meteorological conditions, 3) characteristics of the site, 4) adjustment of the radar, 5) observational technique and 6) observer proficiency. *Subject Headings: 1. Radar precipitation observation.—G.T.*

9H-69

551.501.81:551.509

Ligda, Myron G. H., *Use of radar storm reports in weather analysis and forecasting. Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference, pub. 1956. p. 179-184. 2 figs. DWB*—There is today all assurance that observation of the weather by radar is real and practicable. Radar composites help the forecaster to understand and forecast the situation in the upper air. Any peculiar configuration of the precipitation band has some synoptic meteorological significance or bearing on the future development or movement of the associated front or trough. Careful inspection of the character of the precipitation echoes in various regions and the past history of the system will give clues as to the precipitation stages of development or dissipation patterns. Composite charts of echo movement as well as composite weather map of Oct. 1954 are included. *Subject Headings: 1. Radar weather analysis 2. Radar storm observation application.—V.N.*

9H-70

551.501.81

Ligda, Myron G. H., *Unique radar weather echoes. Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference, pub. 1956. p. 153-162. 11 figs. DWB*—Eleven radar type photographs of unusual echoes are presented and commented on. They include reflections from various types of precipitation, lightning, the sea surface, and some unidentified weather situations. *Subject Headings: 1. Radar echoes from lightning 2. Radar echoes from sea 3. Radar precipitation echoes.—G.T.*

9H-71

551.501.81:551.594

Ligda, Myron G. H. (A. & M. College of Texas). **The use of radar for lightning observation.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 291-296. 4 refs. DWB (M01.81 R124pc)—Transient echoes believed to be produced by ionized columns of lightning discharges have been observed on A, R, RHI, and PPI types of radar indicators. One would reasonably expect that a "sferic" signal should also be received and played on the scopes when the antenna is directed toward a discharge. Taking into consideration observational evidence, propagation and reflection theory, and radar design, a system for the detection of lightning is suggested. Methods for display of the information are also discussed. *Subject Headings: 1. Radar observation of lightning 2. Radar lightning detectors.—Author's abstract.*

9H-72

551.501.81:551.594

Marshall, J. S. (Stormy Weather Group, McGill Univ., Montreal). **The constant-altitude presentation of radar weather patterns.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 321-324. 4 figs. DWB (M01.81 R124pc)—By way of scanning the sky in three dimensions, the antenna of a CPS-9 radar is rotated as for PPI display, but during successive rotations the angle of elevation is increased by not more than one beam-width per rotation to a maximum angle of 10° in winter, 20° in summer. The PPI display is photographed once per revolution on 16 mm film. After processing, the 17 frames of a complete scan are re-synthesized in a specially designed and largely automatic optical printer. The final product is a set of approximately eight map-type pictures, resembling PPI's, but each for a different altitude. *Subject Headings: 1. Constant-altitude radar maps 2. Radar weather analysis.—Author's abstract.*

9H-73

551.508

Marshall, J. S. and East, T. W. R. (both, Stormy Weather Group, McGill Univ., Montreal). **Possible roles of memory tubes in presentation and transmission of radar weather data.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 331-332. DWB (M01.81 R124pc)—Storage tubes are now available that can store the information of a weather radar display. The data can be read out many times, as quickly, or as slowly, as desired, so that the radar designed is free from the disadvantages of a conventional PPI tube. The stored data can be displayed as a large, bright, steady TV picture, or as a permanent facsimile record; it can be combined with geographic or synoptic charts; and transmitted many miles over land lines. *Subject Headings: 1. Radar weather storage tubes 2. Radar data.—Authors' abstract.*

9H-74

551.501.81:551.578

Mathur, P. N. and Mueller, E. A., **Radar back scattering cross-sections from non-spherical drops.** *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 269-273. 3 figs., 9 refs. DWB—A series of experiments with raindrop cameras has shown that the majority of large raindrops within storms is nonspherical. Data obtained with cameras was correlated with radar reflectivities and the results obtained are presented graphically. *Subject Heading: 1. Radar analysis of drops.—N.N.*

9H-75

551.501.81:551.509:551.594

Miles, V. G., **Interpretation of AN/TPQ-6 records.** *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 193-203. 5 figs., 3 refs. DWB—Texas A. & M. College is investigating the possibility of using "cloud base and top" (1-cm) radar in weather observation and forecasting. The author discusses height-time records applicable to clouds at different levels and further explains the slope of shower echoes. Emphasis is laid on upper atmosphere, upper wind observations, radio soundings, radar PPI pictures and the use of the 1 cm radar as being related to meteorological observations. Many graphs and pictures are shown. The author seems to point to the fact that all showers originate from an elevated generating level. *Subject Headings: 1. Radar weather analysis 2. Radar cloud detectors.—N.N.*

9H-76

551.501.8:551.510

Misme, M. P. (Natl. Center of Telecommunication Studies, Paris?), **Anomalies des propagations du radar: un des aspects de la radio-météorologie.** [Radar propagation anomalies: one of the aspects of radio meteorology.] *Mémorial de l'Artillerie Française*, 31 (3):823-843, 1957. 8 figs. Abstract from photostat. DWB (M01.81 M687an)—The various radar propagation anomalies due to atmospheric factors are discussed. The theory of electromagnetic wave refraction and the various techniques of refractive index measurement are reviewed. Results of measurements are presented showing areas in which echoes may be obtained from targets beyond the theoretical range of radar used. It is also found that significant location errors may arise and such errors can be calculated or at least estimated. Echo fluctuations are also caused by short-period irregularities which can easily be confused with actual variations of the target surface. *Subject Heading: 1. Radar propagation anomalies.—Trans. of author's abstract.*

9H-77

551.501.81:551.578.1:551.521.3

Mueller, E. A. (*Illinois State Water Survey*), **Attenuation calculations from drop size distributions.** *Other Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 233-242. 2 figs., 5 refs., eqs. DWB (M01.81 R124pc)—Calculations have been performed on Illinois drop size distributions obtained by photographic means, to determine the rain attenuation for γ radiation. Initially, four storms were analyzed using RAYLEIGH's approximation. It was found that RAYLEIGH's law greatly underestimated the attenuation. Six storms consisting of 1 min. of observations were analyzed using MIE's scattering theory. Regression lines of total cross section on rainfall rate and on back-scattering cross section were obtained. The results of this study agree well with those of MARSHALL as reported in *McGill University Scientific Report, MW-7*. **Subject Headings:** 1. Radar attenuation 2. Mie theory 3. Raindrop size distribution 4. Illinois.—*Author's abstract.*

9H-78

551.501.81:551.578.11

Newell, Reginald E.; Geotis, Spiros G.; Stone, Melvin L. and Fleisher, Aaron, **How round are raindrops?** *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 261-268. 6 figs., 3 refs. DWB—Radar experiments show that particles in the melting layer depart considerably from roundness. The most frequently occurring cancellation values correspond to axial ratios of 0.45 for oblate ellipsoids and 1.9 for prolate. In rain the most frequently occurring values correspond to axial ratios of 0.75 and 1.2, respectively. Snow also appears spherical to the radar. In the melting layer there is evidence that preferred horizontal orientation exists at times while experiments have always shown random orientation in rain. **Subject Heading:** 1. Radar analysis of drops.—*Authors' conclusion.*

9H-79

551.501.81:551.577

Niederschlagsmessung mit Radar. [Precipitation measurements with radar.] *Umschau, Frankfurt a.M.*, 58 (6):167-168, March 1958. 4 figs. DLC—A nontechnical account of the theoretical basis underlying the localization of rainfall and measurement of its intensity by means of radar. Illustrations of radar screen images with different precipitation intervals are presented and procedure of determining a precipitation area on the basis of such images, the errors involved, are discussed. **Subject Heading:** 1. Radar precipitation measurement.—*I.L.D.*

9H-80

551.577:551.588.4 551.577:551.588.7

Pearson, John E. (*State Water Survey Subdivision, Urbana, Ill.*), **The influence of lakes and urban areas on radar observed precipitation echoes.** *American Meteorological Society, Bulletin*, 37 (2):79-82, Feb. 1958. 6 figs., 2 refs. DWB, DLC—Using filmed negatives made of the PPI in AN/CPS-9 radar located at the University of Illinois airport, the author studied the influence of lakes and urban areas on the development of precipitation. An analysis of 3 cases of rainfall shows that two of squall lines showed that Lake Michigan discourages the formation of air mass boundaries. The effect of small lakes and urban areas on the development of radar echoes was made at Bloomington and Lake Bloomington, Ill., and at Springfield and Lake Springfield, Ill. There occurred a noticeable change in the form of echoes which existed before arriving in the observation area. Diagrams of the outline of echoes on the PPI at 15 and 30 min intervals are presented. **Subject Headings:** 1. Radar precipitation observation 2. Urban influences on precipitation 3. Lake influences on precipitation.—*I.L.D.*

9H-81

551.501.81:551.577

Phillips, Wendell, **Interpretation of precipitation echoes observed by conad radar.** *U. S. Air Force, 3d Air Weather Group, Ent Air Force Base, Technical Paper*, No. 4, Aug. 1955. 56 p. 25 figs. (14 cl. photos), table. DWB—General treatment of latest information on precipitation, cloud, hail, sleet, rain, sleet, tornado and other weather radar echoes, for the benefit of Air Defense Command aircraft controllers and radar operators, as well as weather personnel. Theory, equipment and interpretation of various types of echoes and anomalous propagation conditions is treated systematically with numerous radar weather photos and considerable data. **Subject Headings:** 1. Weather radar 2. Radar photographs 3. Radar precipitation echoes.—*M.R.*

9H-82

551.508.85

Radar für den amtlichen Wetterdienst. [Radar for the official weather service.] *Umschau, Frankfurt a.M.*, 58 (6):169, March 1958. DLC—The first German radar installation of the public weather service was put into operation in the Free University of Berlin four months after the weather radar installation in Mülheim. The sender operates on a wave length of 2.3 cm corresponding to 130 MHz and sends pulses of about 20 kW and a length of 1μ sec. The pulse frequency is 500 Hz. The antenna consists of a parabolic mirror shaped like an eccentric pan. The antenna has a convergence of 0.53° in the horizontal and 1.9° in the vertical direction. The installation has a radius

of 200 km towards heavy precipitation and four measurement distances, 25, 50, 100 and 200 km. The usefulness of this installation is illustrated by its use in weather warnings for the Berlin Power and Light Co. *Subject Headings:* 1. Radar equipment 2. Berlin, Germany.—I.L.D.

9H-83

551.501.81:551.57

Richardson, Robert E.; Stacey, Joseph M. and Kohler, Herbert M., (all, M.I.T., Lincoln Lab.) **Radar angels at South Truro, Mass.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-27, 1957, Proceedings Supplement*, pub. 1957. p. 17-22. 6 figs. DWB (M01.81 R124pc)—Maritime overwater targets appear at the South Truro experimental radar which have been erroneously labelled as sea clutter. Investigation of the properties of the individual returns leads to identification of the source of these radar echoes. *Subject Headings:* 1. Radar angels 2. South Truro, Mass.—*Authors' abstract.*

9H-84

551.501.81:551.576:551.55

Rodewald, M., **Radar enthüllt den Höhenwind.** [Radar reveals upper wind.] *Wetterlotse* No. 97:21-24, Feb. 1956. 2 figs. DLC—In 16°N. 56°E. Aug. 1953, surface wind S.W. force 4, radar showed a large rain area travelling from N.E. at 12 km. The wind at 500 mb was N.E. Apparently the rain came from a very high CuNb. *Subject Headings:* 1. Radar echoes from clouds 2. Upper air winds 3. Arabian Sea.—C.E.P.B.

9H-85

551.508.85:551.501.8

Sarrica, Ottavio, **Sull'esame degli echi radar e su alcune particolarità riscontrate nelle formazioni temporalesche.** [An examination of radar echoes and some peculiarities encountered in storm formation.] *Geofisica e Meteorologia*, Genoa, 5(3/4):34-36, May/Aug. 1957. 3 figs. (incl. photos) DWB—Radar echoes occurring simultaneously or in rapid succession can be interpreted more effectively if they are recorded by means of a motion picture for each one or two revolutions of the radar screen. The projection of the film enables a useful observation of the evolution of an individual echo, its velocity and also any orographic influence. At the experimental observatory of Verona of the Central Office of Meteorology and Agricultural Ecology, one of the radar installations is provided with a 16 mm motion picture camera. The operation of this camera during radar observations and its use in the study of particular storms are described with the aid of diagrams and photographs. *Subject Heading:* 1. Radar scope photography.—I.L.D.

9H-86

551.508.8

Schiff, William J. and Williams, Edwin L., **Details of the production model AN/CPS-9 storm detection radar.** *Illinois. State Water Survey Div., Bulletin* No. 41:223-225, 1952. DWB—Detailed description and illustration of operational features of the AN/CPS-9 radar specifically designed for meteorological purposes. *Subject Heading:* 1. AN/CPS-9 radar.—W.N.

9H-87

551.501.81:551.577:551.515

Schnegelsberg, L., **Radar als Wetterberater.** [Radar as weather adviser.] *Wetterlotse*, No. 89:128-131, July 1955. 2 figs. DLC—Advantages of radar for tracking rain squalls at sea are illustrated by radarscopes and accompanying weather N.W. of Bermuda on March 18, 1955. *Subject Heading:* 1. Radar rain squall detection.—C.E.P.B.

9H-88

621.396.9:551.5

Skolnik, Merrill I. (Lincoln Lab., M.I.T.), **Radar horizon and propagation loss.** *Institute Radio Engineers, Proceedings*, 45(5, Pt. 1):697-698, May 1957. 3 figs., 11 refs. DLC—Three graphs show the geometrical range of radar, the propagation losses for 2-way propagation, and the contours of radar coverage for various cases at various heights. It is pointed out that the use of theoretical geometrical propagation tables or charts gives a far too optimistic signal strength; attenuation is neglected for UHF waves over a line-of-sight path even for normal conditions. *Subject Heading:* 1. Radar propagation losses.—M.R.

9H-89

551.501.81:551.577

*Stansbury, Thomas A., **Radar rain intensity measurement from naval aircraft and ship.** Johns Hopkins Univ. Applied Physics Lab., Silver Spring, Md., Contract NOrd 7386, (Report CM-930, Dec. 1957. 22 p. 6 figs., 8 tables, 7 refs. DWB (M(055)J66c)—For the first time aircraft and shipboard radar successfully measured rain intensities over thousands of square miles of open sea. Use of these radar made three dimensional studies of rainfall in thunderstorms possible. It was found that at 3-cm and 10-cm wave lengths, the discrepancy between theory and practice of rain back-scattering is a constant of 7 db. Also, this discrepancy is not a function of wave length nor is it characteristic of a particular radar. *Subject Headings:* 1. Radar precipitation intensity measurement 2. Marine radar 3. Air-borne weather radar.—*Author's abstract.*

9H-90

551.501.8:551.509.31

Stout, G. E. and Spock, M., Jr., **Radar observation of anomalous-type echoes.** *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, pub. 1956. p. 67-72. 3 figs., refs. DWB—Meteorological factors responsible for the widespread echo activity in Illinois on Oct. 13, 1954 are investigated. At 1230 CST a 1003 mb low center was created in east-central Nebraska, a cold front oriented south-eastward from the low center; inactive warm front in northern Missouri, south-central Illinois and eastward. At Cehanuti Air Force Base (RAN), the winds at 0000 shifted 80° in the lower 10,000 ft while at 0900 they veered 130° and increased with height; moist advection occurred up to 10,000 ft. Showalter Stability Index was +9 at 0900 and +1 at 1500. Isothermal layer and the inversion were absent by 1500. Cloud sequence photographs and radar echo pictures are presented and discussed. *Subject Headings: 1. Radar echo anomalies 2. Radar weather analysis.—N.N.*

9H-91

551.508.85:551.509.54

Swingle, Donald M. (Belmar, N. J.), **The effect of attenuation on the range performance of AN/CPS-9.** *Illinois. State Water Survey Division, Bulletin*, No. 41, 1952. p. 277-282. DWB—After briefly reviewing the developments of meteorological instruments from early days and to the invention of radar, it is stated that the AN/CPS-9 set is specifically designed as a tool for the meteorologist in weather forecasting. The manner in which the operating wavelength was chosen is outlined, and the effect of attenuation due to various intensities of rain, on the range of various types of equipment, analyzed. *Subject Headings: 1. AN/CPS-9 radar 2. Radar attenuation.—W.N.*

9H-92

551.501.81:551.515.3

Texas. Agricultural and Mechanical College. Research Foundation, **Texas radar tornado warning network.** 1954? unpagged. diagr., photos. DWB—Usefulness of a radar tornado warning network in Texas such as is shown on a plan chart is stressed. Cost of each station would be \$1000 for modifying surplus sets, \$3-\$7 thousand for installation (including a protective radome). The network proposed will become a unit in a comprehensive warning plan for the whole tornado area in cooperation with U. S. W. B. facilities everywhere. Reports will aid in general and airways forecasting, too. *Subject Headings: 1. Radar tornado warning networks 2. Texas tornado warning network 3. Texas.—M.R.*

9H-93

551.501.6:523.3

Thomas, A. B., **Certain physical constants and their relation to the Doppler shift in radio echoes from the moon.** *Australian Journal of Science*, 11(6):187-192, June 1949. 2 tables, refs. DLC—The Doppler frequency shift in radio echoes from the moon is due mainly to the rotation of the earth and the consequent velocities of the transmitter and receiver stations. Other factors are the moon's orbital motion, and the effects of the ionosphere and of reflection at the moon's surface. A theoretical investigation has brought to light some interesting facts concerning our knowledge of the radius of the earth and the deflection of the vertical in Sidney, and the motion of the moon. The effects of the ionosphere, and possibly of reflection at the moon's surface, prevent any independent determination of any of the physical constants involved by these means. *Subject Headings: 1. Radio echoes from moon 2. Doppler frequency shift 3. Ionospheric radio wave refraction.—Author's abstract.*

9H-94

551.501.81:551.577.11:551.515.4:551.515.23:551.515.8

Tokyo. Meteorological Research Institute. Aerological Laboratory, **Report of the radar observations during summer 1954.** *Journal of Meteorological Research*, Tokyo, 7(7):387-421, Oct. 1955. 144 figs., table, foot-refs. In Japanese; English summary p. 387. DWB—The meteorological radar of the Meteorological Research Institute was installed at the Institute in Tokyo in the late spring of 1954. Its main characteristics are as follows: peak power output, 270 kW; operating frequency, 9,375 mC; maximum range, 300 km; antenna beam, 1° conical beam; indicators, "PPI, 12"-RHI, and 7"-A-scope. With this radar set, a good deal of observation of thunderstorms, typhoons, and many other rainstorms were made during summer through autumn of 1954. This report contains some radarscope photographs taken in this period, echo patterns traced from 16-mm movie films, and some results of investigations on the corresponding meteorological situations. *Subject Headings: 1. Radar observations 2. Japan.—Author's abstract.*

9H-95

551.501.81

Truppi, Lawrence E. (Nail, Weather Records Center, U. S. W. B.), **Radar and weather.** *Mariners Weather Log*, Wash., D. C., 2(1):1-7, Jan. 1958. 7 figs. DWB—Meteorological information on tropical storms, squall lines and thunderstorms can be obtained by marine radarscopes. On the squall lines the radar will only detect precipitation associated with the front. A few types of precipitation discussed here are: (1) mature thunderstorms and convective showers with raindrop

echoes about a million times stronger than those from cloud droplets, 2) isolated showers with echoes which can be distinguished from others, 3) squall lines, 4) instability lines, 5) warm front precipitation, and 6) tropical storms. *Subject Headings: 1. Radar meteorology 2. Marine radar.—N.N.*

9H-96

621.396.826(02) 551.501.81(02)

U. S. Air Force, **Radar circuit analysis.** Its *AF Manual* 52-8, 1951. 13 chapters (each chapter renubers from 1), numerous figs. and eqs. May be obtained from Govt. Print. Off., Wash., 25 D. C. **DWB**—An elaborate circuit maintenance manual for radar operation, including chapters on mathematics for radar, D. C. and A. C. circuits, measuring instruments, tubes and power supplies, principles of radar, timing circuits, amplifiers, modulation and detection, radio frequency line waveguides, oscillators, antennas, and servo-mechanisms. *Subject Headings: 1. Radar maintenance manuals 2. Manuals.—M.R.*

9H-97

551.501.81

U. S. Air Weather Service, **Radar weather observations.** Its *Manual*, AWSM 105-27, April 1 1958. 22 p. fig. **DWB** (M(055) U58am)—The purpose of this manual is to prescribe plain language code form and procedures to be used in reporting radar weather observations, replacing the numerical code which was found to be too complicated for general use. Instructions are included on operating procedures, observations, vertical scan data, scope photography, display of radar observations and quality control procedures. *Subject Heading: 1. Radar meteorology manuals.—G.T.*

9H-98

551.501.81:551.515.2/3:3F

U. S. Congress. 84th. First Session, *Congressional Record*, 101(99), June 14, 1955. *Ibid.* 101(100), June 15, and 101(101), June 16, 1955. **DWB**—On these 3 days, several aspects of U. S. Weather Bureau appropriations were discussed at length by senators from Florida, Rhode Island, Oklahoma, S. Dakota, etc. The main argument was over the \$4-\$5 million additional appropriation for hurricane and severe storm warning equipment, research and surveys. Letters and newspaper articles included in text testify to the small cost for research and radar equipment compared with huge damage and loss of life in one hurricane or tornado. It was stated that radar at Cape Hatteras could have given more timely and accurate warnings to New England at the time of Hurricane "Carol." See p. 6859, 6880, 6898-6904, 6927-29 June 14; p. 6995, 7069, D555 and D561 June 15 and p. 7171, 7172, 7219, 7220, 7262, 7266 and 7267 June 16, 1955. *Subject Headings: 1. U. S. Weather Bureau appropriations 2. Hurricane warning networks 3. Tornado warning networks 4. Radar storm detection equipment.—M.R.*

9H-99

551.501.8(02)

U. S. Weather Bureau, **Training guide in radar meteorological observations.** Its *Training Paper*, No. 10, Sept. 1953. 37 p. 16 figs. **DWB** (M01.1 U587tr)—The 7 chapters of this manual cover: 1) basic principles of radar (general, PPI-scope, A-scope, meteorological echoes and beam width); 2) use of radar in weather observing and forecasting (weather patterns, tornado echoes and reports); 3) operation of radar (range setting, receiver gain adjustment, effects of location and abnormal echoes); 4) observation and evaluation of echoes (character, intensity, tendency, position, orientation, length, width, direction and speed of motion, height including height nomogram); 5) entries on forms; 6) transmission of radar reports; and 7) verification of radar echoes. The guide is for the use of observers and forecasters in getting a general but not a detailed knowledge of the capacities and limitations of radar for forecasting weather and applies specifically to U. S. Weather Bureau APS-2F radar but in general to all types. Synoptic examples are illustrated by radar photographs for fronts, squalls, tornadoes and spiral precipitation bands. *Subject Headings: 1. Radar meteorology manuals 2. Training manuals.—M.R.*

9H-100

551.501.

[U. S. Weather Bureau], **How radar works.** U. S. Weather Bureau (1956?). 16 p. 16 figs. **DWB**—General principles of microwave propagation, echoes, radar construction, maintenance and operation are set forth in a well illustrated guide for use by those engaged in routine operations using radar sets (such as balloon tracking) although no reference is made to any meteorological or weather application. *Subject Heading: 1. Radar operation.—M.R.*

9H-101

551.501.81:551.594.5

Unwin, R. S. and Gadsden, M. (both, *IGY Station, Dept. of Sci. & Ind. Res., Awarua Radio Invercargill, New Zealand*), **Determination of auroral height by radar.** *Nature*, London, 180(4600), 1469-1470, Dec. 28, 1957. 2 figs., 3 refs. **DWB, DLC**—Auroral radio echoes observed by radar operating at 55 Mc/s at Bluff in the South Island of New Zealand. A well-defined aerial lobe pattern is obtained by interference of the direct and sea-reflected rays up to an angle of elevation of about 10°. The polarization is horizontal resulting in deep minima between lobes. A range-time record

auroral echoes and a graph of observed heights of auroral echoing regions versus observed ranges are presented. The region producing the echoes occurs as an approximately horizontal sheet at an average height of 110 km. *Subject Headings:* 1. Radar echoes from auroras 2. Auroral height determination by radar 3. Bluff, South Island, New Zealand.—*I.L.D.*

9H-102

551.501.8:551.577:551.515.11

Watanabe, Kazuo (A. & M. College of Texas), *The effect of cold air advection upon radar echo.* *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings, pub. 1957.* p. 201-205. 7 figs., 5 refs. **DWB** (M01.81 R124pc)—This paper presents a study of precipitation echoes associated with cold air advection at upper levels which occurred in the storm of March 31-April 1, 1955. It is shown that cold air advection influenced the total convective pattern, and resulted in characteristic precipitation echo development, the line echo identified with cold frontal invasion, for example. More extensive case studies are necessary to deduce a generalized theory for the formation of line squalls. *Subject Headings:* 1. Radar precipitation echoes 2. Cold air advection effects on radar echoes.—*Author's abstract.*

9H-103

551.509.52:551.508.85

Weather radars ordered. *Science News Letter, 70(6):86, Aug. 11, 1956.* **DLC**—Contract was made with Raytheon for 31 new specialized weather radar sets to be delivered in 1958, and placed in the storm warning network. They will permit better forecasting of flash floods, tornadoes and hurricanes. They will be located both inland, and along the East Coast. Eight sets will be used by the Navy's Bureau of Aeronautics, making in all 39 costing \$3,800,000. The sets are convertible and can operate at 9300, 5600 and 2800 mc, depending on seasonal types of hazard. Photograph on cover shows one of the scopes for the new sets. *Subject Headings:* 1. Radar equipment 2. Radar storm detection networks 3. Storm warning networks.—*M.R.*

9H-104

551.508.85:551.576.4

Weinstein, J., *Reflection considerations in the radar design of cloud base and top indicator.* *U. S. Signal Corps Engineering Laboratories, Presentation, 22, 1953?* 7 p. 3 tables, 2 figs., refs. **DWB**—The experiments on development of radar cloud detector made at Evans Signal Laboratory at 3.86 cm wave length are described and the information on power return vs. cloud particle size obtained by WEXLER and SWINGLE (1945-6) reviewed and extended. The latter is considered inadequate for the present purposes. *Subject Headings:* 1. Radar cloud indicators 2. Cloud base and top measurement. **I. Wexler, Raymond.**—*M.R.*

9H-105

551.501.81:551.577.37

Wexler, Raymond (Evans Signal Lab.), *Optimum wave length for storm detection through rain.* *U. S. Evans Signal Laboratory, Belmar, New Jersey, Technical Memorandum, No. M1004, Sept. 10, 1946.* 8 p. 2 figs., 2 tables, 9 refs., 6 eqs. **DWB**—The power received from rainstorms of a given intensity is derived as a function of the wavelength. Assuming atmospheric attenuation, it is shown that a wave length near 2.5 cm gives greatest signal return from storms 200 km distant. Through 10 km of light, moderate and heavy rain, the respective use of wavelength near 2.5, 3.5 and 4.5 cm gives greatest signal return. An examination of the frequency distribution of rain intensities indicates that X band is quite suitable for storm detection in middle latitudes. In tropical latitudes for detection through heavy rains over considerable distances, the use of S band appears more suitable. *Subject Heading:* 1. Radar storm detection through rain.—*Author's abstract.*

9H-106

551.501.81:551.577.11

Wexler, Raymond, *Evaluation of the physical effects in the melting layer.* *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference, pub. 1956.* p. 329-334. fig., 3 tables, 9 refs. **DWB**—Four factors have a significant influence on the echo intensity of the melting layer during continuous precipitation: the change in dielectric constant, an increased fall velocity, the shape of melting snowflakes, and their growth by accretion. The magnitude of change due to each of these factors is evaluated. *Subject Heading:* 1. Radar analysis of precipitation.—*N.N.*

9H-107

551.524.4:551.577.11

Wexler, Raymond (Blue Hill Met. Obs., Harvard Univ.), *The lapse rate in the melting layer.* *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings, pub. 1957.* p. 83-87. fig., 3 refs., 13 eqs. **DWB** (M01.81 R124pc)—The lapse rate of rising saturated air cooled by melting snow is derived. It is found that this (neutral) lapse rate ranges from about 9° to 14°C/KM. The changes in the depth and lapse rate of the melting layer are analyzed. Due to cooling by melting snow, the upper portion of the initial layer becomes stable and eventually isothermal at 0°C. A steep lapse rate develops in the lower portion. Depending on the original lapse

rate, the depth of the melting layer increases by a factor of 1.6 to 1.8, and then, when isothermal melting has been reached in the original layer, decreases to 0.6 to 0.8 of its original value. From 2 to 5 mm of melted snow is required for this transformation. Thereafter the melting layer remains at about constant thickness. *Subject Headings: 1. Lapse rates 2. Snow melt effects on lapse rate.—Author's abstract.*

9H-108

551.501.81:551.577.1

Yoshihara, Z., *Radar observations of rainfall intensities with a recording system.* *Journal of Meteorological Research*, Tokyo, 7(7):439-445, Oct. 1955. 9 figs., 7 eqs. In Japanese; English summary p. 439. **DWB**—Radar echo intensities received from rain were recorded by means of a continual recording system with three position selector pulses and were compared with the rainfall intensities recorded on rain gages. The purpose of this study was to determine the mutual relationship between the records of the rain gages and the recording system. The rain gages were set at three locations, 16, 18 and 21 km WNW of the radar station. The positions of the selector pulses were adjusted to correspond to these stations on the A-scope indicator of the radar. Analysis was done to examine how accurately a radar-rainfall observation can represent the point-rainfall rates. The results show that the values of rainfall intensities calculated from radar storm equation are in good agreement with observed values, but it must be remarked that the standard errors of radar-observed rainfall values are in the range of 30 to 60% of rain gage rainfall rates. *Subject Headings: 1. Radar rainfall measurement 2. Rain gages 3. Rainfall intensities.—Author's abstract.*

9H-109

551.508.85:551.577.2

Yoshihara, Z., *The accuracy of radar observations of rainfall.* *Journal of Meteorological Research*, Tokyo, 8(9):568-573, Oct. 1956. 4 figs., 4 tables, 7 refs., 5 eqs. In Japanese; English summary p. 568. **DWB, DLC**—It has already been reported by the author that the standard errors of rainfall rates observed by radar are in the range of 30 to 60% of rainfall rates observed by rain gage. The purpose of this report is to discuss the accuracy of radar observations of rainfall assuming that the observed errors are caused by the variations of the raindrop size-distribution and by the variation of the radar characteristics including path attenuation. The power returned from rain at a distance of r from the radar is given by

$$P_r = \frac{C}{r^2} Z,$$

where C is a constant including the radar characteristics, path attenuation and the dielectric properties of precipitation particles, and Z is the so-called radar reflectivity factor. There exists a statistical relationship between Z and the rainfall rate R , that is

$$Z = Br^\beta,$$

where the constants β and B vary widely with the distribution of raindrop size. In this report, the relationships P_r-R , $Z-R$ and P_r-Z are examined, where P_r was obtained from a recording system (pulse integrator), Z was computed from raindrop data and R was obtained from a standard rain gage with 6-hr chart-drive. The results were presented in tables and figs. *Subject Heading: 1. Radar rainfall measurement.—Author's abstract.*

SUPPLEMENTARY MATERIAL

9H-110

551.501.81:551.576

Donaldson, Ralph J., Jr., *Cloud base detection by airborne radar.* *U. S. Air Force, Cambridge Research Center, Air Force Surveys in Geophysics*, No. 97, April 1958. 13 p. 6 figs., 5 refs. **DWB, DLC**—Conditions under which cloud bases can be detected by radar from a position above the clouds and the optimum wavelength to use are considered. Minimum detectable radar reflectivity factor Z is computed as a function of horizontal range along the earth's surface from the radar position to the cloud base. The computations are based on liquid and ice models and assume radar at several wavelengths, various heights above cloud base, and different cloud attenuations. Computed values of Z are expressed in terms of the fraction of natural clouds that would be detectable. Computations demonstrate superiority of 0.9-cm wavelength with presently realizable equipment. With 0.9-cm, most ice cloud bases would be detected out to a 50 mi horizontal range; however, high attenuation in liquid clouds prevents detection of more than a small fraction of their bases except when the radar points vertically down. *Subject Headings: 1. Air-borne weather radar 2. Radar cloud detection 3. Cloud base detection.—Author's abstract.*

9H-111

551.501.81:551.579:551.509

Tarble, R. D. and Conover, L. F., *The use of radar in detecting flood potential precipitation and its application to the field of hydrology*. May 1957. Thesis (M.Sc.) Texas Agricultural and Mechanical College. 79 p. 33 figs., 3 tables, 18 refs. Also as: *Use of radar in the field of hydrology*. *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings Supplement*, pub. 1957. p. 9-16. 2 figs., 11 refs. DWB (M01.81 R124pc)—Hydrologists have, in the past, been hampered considerably by sparse networks of precipitation gages and poor communications in obtaining necessary precipitation data for the preparation of their river and flood forecasts. During recent years, increased radar installations have placed a significant tool in the hands of river forecasters. Radar can detect precipitation over a large area and also the variation in the intensity of the precipitation. This paper discusses these uses of radar, as well as some simple photographic procedures being developed as a practical aid. *Subject Headings: 1. Radar hydrology 2. River forecasting 3. Flood forecasting.—Authors' abstract.*

9H-112

551.501.81:551.578.41:551.593.7

Newell, Reginald E. and Patterson, Leif (*both, Weather Radar Research, M.I.T.*), *Comparison of measured and calculated values of depolarization for dry snowflakes*. *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 43-49. 3 figs., table, 11 refs. DWB (M01.81 R124pc)—Radar polarization measurements on snow taken during the winters of 1954-55 and 1955-56 revealed that dry snowflakes depolarize the incident radiation significantly. Application of GAN's theory to snow of density 0.05 gm/cm^3 by ATLAS, KERKER, and HITSCHFELD predicted no measurable depolarization. Calculations of the depolarization for various axial ratios, densities and snowflake sizes have been made using STEVENSON's scattering theory which appears to allow somewhat larger particles to be considered. The results differ little from GAN's theory, and hence fail to explain the difference between the observed and calculated depolarizations. *Subject Headings: 1. Radar polarization measurements 2. Depolarization by dry snowflakes.—Authors' abstract.*

9H-113

551.501.8

Elder, Floyd C. (*Engr. Res. Inst., Univ. of Michigan*), *Some persistent "ring" angels on high-powered radar*. *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 281-290. 4 figs., 2 tables, 3 refs. DWB (M01.81 R124pc)—Persistent radar angels of the form of concentric "rings" have been observed on an L-band radar operating on twenty mile range at a one degree antenna tilt. The "rings" originate as a point target and have an average radial growth of about 43 kn. Occurrence of the angels is not well correlated with location of local topographic features or with observed weather. It is proposed that the angels may result from deflection of radar energy from a shear-gravity wave existing on an atmospheric density discontinuity. *Subject Heading: 1. Radar angels.—Author's abstract.*

9H-114

551.508.85

Bell, G. (*Deutscher Wetterdienst, Frankfurt a.M., Germany*), *Weather radar activities of the German Meteorological Service*. *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 365. DWB (M01.81 R124pc)—The German Weather Service has 6 English 10 cm AA No. 3 MKII radars for upper wind measurements. Other equipment being installed or on order is described. A conference was held at Essen on June 26 and 27, 1956 where meteorology and radio navigation were discussed. *Subject Headings: 1. Radar equipment 2. German Federal Meteorological Service.—M.R.*

9H-115

551.501.81:551.551

Rogers, Roddy R. (*Weather Radar Research, M.I.T.*), *Radar measurement of gustiness*. *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 99-106. 3 figs., 4 refs. DWB (M01.81 R124pc)—Fluctuations in the radar signal are caused by the scattering of the precipitation particles. Information about wind structure in the sampled volume contained in these fluctuations, since wind accounts for the movements of particles. The R-meter is an instrument which counts the number of times the fluctuating signal crosses an arbitrary level, which rate is directly proportional to the sum of the variances of the wind shear, gustiness, and differential fall velocities in the direction of the beam. The most probable value of a horizontal gust is 0.6 m sec^{-1} , about twice that of a vertical gust. No gust velocity greater than 150 cm sec^{-1} is observed, and all values appear to be independent of the mean wind speed. *Subject Headings: 1. Radar wind measurement techniques 2. Gustiness measurements.—Author's abstract.*

9H-116

551.501.81:551.577

Smith, Robert L. (*A. & M. College of Texas*), *Synoptic scale storm observations*. *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 171-177.

6 figs., 2 refs. **DWB** (M01.81 R124pc)—A few of the composite PPI radarscope pictures selected from the files of the Texas A. & M. College Radar Meteorology Section, which show the most extended coverage of precipitation echo distribution obtained to date, are shown and briefly discussed. *Subject Heading: 1. Radar precipitation echoes.—Author's abstract.*

9H-117

551.501.81:551.58

Riggs, Lowell P. and Truppi, Lawrence E. (both, A. & M. College of Texas), **A survey of radar climatology.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 227-232. 2 figs., table, 7 refs. **DWB** (M01.81 R124pc)—This study investigates various methods of extracting climatological data from radarscope film records, and discusses the results of previously conducted radar climatological surveys. *Subject Heading: 1. Radar climatology.—Authors' abstract.*

9H-118

551.508.85

Ruskin, R. E. (U. S. Naval Res. Lab.), **A method of obtaining constant altitude and other PPI pictures from simple weather radars.** *Weather Radar Conference, 6th, Cambridge, Mass., March 26-28, 1957, Proceedings*, pub. 1957. p. 339-340. **DWB** (M01.81 R124pc)—A method is described whereby a PPI type facsimile picture is produced by scanning a weather radar "A" scope. Using an inexpensive radar set with a proper antenna drive, this system can provide PPI, RHI, or constant altitude presentation without modification of the radar circuits. When used with a calibrated attenuation circuit, iso-echo contours can also be printed. Using the radar pulse repetition frequency as the carrier, the facsimile circuitry is simple and a signal suitable for remoting over ordinary telephone lines can be provided. *Subject Heading: 1. Weather radar 2. Constant altitude radar maps 3. Radar equipment.—Author's abstract.*

9H-119

551.501.81:061.

Radar and meteorology. *World Meteorological Organization, WMO Bulletin*, 5(4):155-157. Oct. 1956. photo. **DWB**—A "Radar and Meteorology" seminar was held in the Haus der Technik at Essen on June 26 and 27, 1956, under chairmanship of GENERAL MARTINI of the Committee for Radar. Technical lectures covered subjects such as radar, wind, atmospherics, weather, navigation and related problems. Various types of 3.2 and 10 cm sets were considered. *Subject Heading: 1. Radar meteorology conferences 2. Essen, Germany.—M.R.*

9H-120

551.501.81:551.577.1

Boucher, Roland J., **The development and growth of precipitation in three New England coastal cyclones: a radar-synoptic analysis.** *Blue Hill Meteorological Observatory, Contract AF 19(604)-950, Meteorological Radar Studies*, No. 9, March 21, 1958. 43 p. 39 figs. **DWB**—Three New England coastal storms (northeasters) are studied, by means of conventional synoptic analyses and radar, in seeking information on the processes which produce the heavy precipitation characteristic of this type of storm. The evidence obtained, much of it through the use of reflectivity cross sections constructed from gain-stepped RHI pictures, indicates that the precipitation process within 200 miles of the Low center is characterized by vertical motions or updrafts of limited horizontal dimensions and of a higher order of magnitude than the large scale vertical motions generally ascribed to macroscale cyclonic circulations. The close relation of broad bands on the PPI to the sea level isobars suggests the possibility of establishing an operationally useful technique for tracking the motion and state of development of this type of storm when the precipitation is in the form of drizzle or snow. *Subject Headings: 1. Radar synoptic analysis 2. Precipitation mechanism 3. New England.—From author's abstract.*

9H-121

551.501.81:551.577.1

Wexler, Raymond and Atlas, David, **Vertical structure of continuous streamer-form precipitation.** *Blue Hill Meteorological Observatory, Contract AF 19(604)-950 and Contract AF 19(604)-3492, Meteorological Radar Studies*, No. 10, March 25, 1958. 38 p. 15 figs., 18 refs. **DWB**—Quantitative radar reflectivity measurement of precipitation along the vertical is discussed as a means of studying the structure of generating cells within storms. The application of this method is shown on the examples of detailed analyses of three storms over New England. *Subject Headings: 1. Radar precipitation studies 2. Precipitation mechanism 3. New England.—G. T.*

9H-122

551.501.81:551.515.4:551.518

Shackford, Charles R., **Radar observation of cold front thunderstorms of July 14, 1956.** *Blue Hill Meteorological Observatory, Contract AF 19(604)-950, Meteorological Radar Studies*, No. 11, March 28, 1958. 39 p. 30 figs., 2 tables, 9 refs. **DWB**—On July 14, 1956 a squall line of intense thunderstorms, developing principally in New England before a fast moving cold front in a conditionally unstable atmosphere, produced severe weather at the surface. It is shown that orographic

tures were associated with the initial radar echo appearances of the storms. Intensification of the echoes as observed by CPS-9 radar was found to be associated with their combination, passage over specific geographic areas and their abrupt change of course. A qualitative relationship is shown to exist between radar intensification and severe weather at the surface. A negative correlation between echo speed and height were found to exist. *Subject Headings: 1. Radar thunderstorm observation 2. New England.—Author's abstract.*

9H-123

551.501.81:551.509.311

Blue Hill Meteorological Observatory, Study of synoptic-dynamic influences on the nature of cloud and precipitation echoes, Oct. 1953–Feb. 1958. Contract AF 19(604)-950, Final Report, Meteorological Radar Studies, March 28, 1958. 36 p. refs. DWB—Includes abstracts of the Meteorological Radar Studies done under the Contract and two additional articles: Boucher, Roland J.: Use of radar in forecasting cold season precipitation, especially at Boston, p. 26–31. Boucher, Roland J.: Geographical distribution of initial convective radar echoes as observed at Blue Hill, p. 32–34. 2 figs. *Subject Headings: 1. Radar synoptic analysis 2. New England. Boucher, Roland J.—D.M.G.*

9H-124

551.508:551.576.11

Chmela, Albert C. and Armstrong, Graham M., Observations of "angels" beneath convective clouds. *Weather Radar Conference, 5th, Asbury Park, N. J., Sept. 12–15, 1955, Proceedings*, pub. 56. p. 63–66. 2 figs., 3 refs. DWB—On Oct. 22, 1954, a series of angel outbursts were observed at the Weather Radar Research Center, Lexington, Mass. Overhead, at a height of 6000 ft MSL, scattered cumulus humilis and stratocumulus clouds passed. The echoes/min. below the 5000 ft layer increased sharply from 8 to 50; the actual frequency of angel echoes approached a maximum of about 125–170/min. during the passage of the cloud. The maximum height of observation rose from below 2000 ft to 4500 ft. The echoes reached their maximum both in altitude and in the frequency of occurrence when the associated cloud was directly overhead. As the cloud passed out of the radar beam, angel activity returned to normal with echo frequency of 8–10 on the fax record. *Subject Heading: 1. Radar angels.—N.N.*

9H-125

551.501.81:551.590.25

Greenhow, J. S., Meteor trail measurements by radio echo detection means. Jodrell Bank Experimental Station (of Univ. of Manchester), Cheshire, England, Contract AF 61(514)-948, Technical Note, No. 1, May 1, 1956–April 30, 1957. 17 p. 4 figs., 11 refs. DWB (M90.25 T63te)—The reflection of radio waves from the ionized trails produced by meteors as they burn away in the upper atmosphere is discussed. In particular the process of evaporation of meteor atoms is considered in relation to upper atmosphere pressures and temperatures. Expressions relating atmospheric pressure at the point at which a meteor produces its maximum ionisation, to meteor velocity and other physical properties of meteors are given. It is shown that measurements of pressure, density and temperature in the region 80 to 100 km. above the earth can be made by observations of the heights of reflection of meteor echoes. As sporadic meteors occur at all times of the day and night, this method enables the diurnal and seasonal variations of the physical properties of the atmosphere between altitudes of 80 and 100 km to be studied in detail. The design of a sensitive radar equipment operating at a wavelength of 8.2 m. is discussed and sections are devoted to the transmitter, receivers, display and aerial systems. The accuracy of height determination is shown to be of the order of ± 2 km. The expected usable echo rate is approximately 200 per day, an order of magnitude increase over the echo rate with the existing 4 metre equipment. It should therefore be possible to obtain mean atmospheric profiles in one or two days' observing time, and to observe diurnal variations by integrating approximately fourteen days observations. *Subject Heading: Radar echoes from meteor trails.—Author's abstract.*

9H-126

551.501.81:551.515.12

Hiser, Homer W., Radar analysis of two severe storms in South Florida. *American Meteorological Society, Bulletin*, 39(7):353–359, July 1958. 6 figs., table, 6 refs. DWB—Radar photographs of two distinctly different severe storms are analyzed. The data include both PPI and RHI photographs collected on two different radars at the University of Miami for purposes of comparison. A table is included which gives the characteristics of the radars. The significant features of the storms shown by radar are compared with the findings of other researchers in different parts of the U. S. *Subject Headings: 1. Radar storm analysis 2. Miami, Fla.—Author's abstract.*

9H-127

551.501.81:551.509.311:551.515.12

Kessler, Edwin, III, Radar-synoptic analysis of an intense winter storm. *U. S. Air Force, Cambridge Research Center, Geophysical Research Papers*, No. 56, Oct. 1957. 218 p. figs., photos, tables, 59 refs., eqs. DWB, DLC—This paper presents the results of a study made to discover as

much as is contained in available observations concerning the motion and precipitation fields of the severe New England snowstorm of 16 March 1956. General methods are here developed and applied to obtain particular results. The former include, first a calibration of photographs of the Range Height radar display, which permits their use for mapping three dimensional distributions of normalized echo intensity. Secondly, empirical and theoretical data concerning weather radar echoes and their associated distributions of particles have been combined with a relation between updrafts in saturated air and precipitation rate to give a theory relating radar echoes to the dynamics of steady and horizontally uniform precipitation. Conventional synoptic methods are also employed in this work and certain details concerning their application are discussed at length. The net result of this phase of the present effort is a radar-synoptic method which combines the numerous data available to give a more effective atmospheric probe than is provided by their piecemeal use. Among other things, this study and others demonstrate that the use of radar can add significantly to studies of both large and small scale weather phenomena. Radar and conventional synoptic data are of greatest value when used jointly. *Subject Headings: 1. Radar synoptic analysis 2. Snowstorm 3. New England.—From author's abstract.*

9H-128

551.501.81:551.594.4

Lange-Hesse, Günther (*Max-Planck-Inst. f. Physik der Stratosphäre, Lindau ü. Northeim Hann.*), *Rückstrahlung kurzer und ultrakurzer Wellen an Polarlichtern*. [Reflection of short and ultrashort waves from polar auroras.] *Archiv der Elektrischen Übertragung*, Stuttgart, 11 (6):253-261, June 1957. Pt. 2, *Ibid.*, 11 (7):283-288, July 1958. figs., 92 refs. English summary p. 253. **DLC**—Recent progress achieved in different countries in observing and interpreting auroral echoes is reviewed. Sample radar scope photographs, and diagrams of echo distribution are presented. Applications to radio communication, navigation and auroral observation are discussed. Of various interpretations proposed so far concerning different characteristics of auroral echoes, the author favors those of BOOKER. *Subject Heading: 1. Radar echoes from auroras.—G.T.*

9H-129

551.501.81:551.594.4

Meos, Johan and Olving, Sven, *On the origin of radar echoes associated with auroral activity Göteborg, Sweden. Chalmers Tekniska Hogskola, Handlingar*, No. 196, 1958. 20 p. 14 figs., table 21 refs. **DLC**—Until very recently it has been accepted that most of the VHF radio echoes obtained near the polar regions during geomagnetic storms were due to direct scatter from auroral displays. HARANG and LANDMARK (1954) however, have published a paper where they explain the echoes as backscatter from land or sea via intense sporadic ionospheric layers in the E-region. An analysis of the echoes at 10 m wavelength, recorded at the Kiruna Radio Wave Propagation Observatory during the first quarter of 1953, indicates that the echoes cannot be disconnected from auroral borealis. It is concluded that the predominant mechanism is closely connected to ionized and often invisible auroral forms. *Subject Heading: 1. Radar echoes from auroras.—From author's summary.*

9H-130

551.501.81:551.578.1

†Newell, Reginald E.; Geotis, Spiros G. and Fleisher, Aaron, *Shape of rain and snow at microwave lengths*. Massachusetts Institute of Technology. Dept. of Meteorology, Contract DA-36-03-Sc-71136, Radar Weather Research Report No. 28, Sept. 1957. 103 p. 36 figs., 5 tables, 34 refs. numerous eqs. **DWB** (M01.81 M414w)—A technique is described in detail whereby shape and orientation of hydrometeors can be measured. The technique involves the use of 3.2 cm radar, whose polarization changes as a function of particle shape and orientation. Results of observation made in showers, rain, snow and the melting layer are reported. *Subject Headings: 1. Radar precipitation particle observation 2. Rain drop shape.—G.T.*

PART III. REVIEWS, RECENT MONOGRAPHS AND ANALYTICS FROM SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of *Meteorological Abstracts and Bibliography*.

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERIAL

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- ol'tsov, M. M.; Maksimov, S. A. and Iaroshevskii, V. A.: **Praktische Agrarmeteorologie** [Practical agricultural meteorology]. Berlin, Deutscher Bauernverlag, 1955. 310 p. 47 figs., 85 tables, 24 refs., 22 eqs. Review by F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, Vienna, 8(2):268-269, 1957. (See 8.4-12, April 1957, *MAB*)
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C. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Acta Geophysica Polonica, Warsaw, Vol. 6, No. 1, 1958

- Schmuck, Adam: **Der Wert P-E [Niederschlag Minus Verdunstung] bei freien Wasseroberflächen in Polen: ein Berechnungsversuch**, [The P-E (Precipitation minus evaporation) index for free water surfaces in Poland: a statistical investigation], p. 5-17
- Szpor, S. and Kotłowski, J.: **Series of photographic studies on lightning and air discharge**, p. 18-31
- Teisseyre, Roman: **Seismic waves in an ideal guide with an arbitrary point source**, p. 32-48
- Przybyszewski, Eugeniusz: **Pórowanie magnetometrów La Coura Obserwatorium Geofizycznego na Helu, Obserwatorium Geofizycznego w Świdrze i Uniwersytetu Warszawskiego**, [Comparison of La Cour Magnetometers of the Geophysical Observatory on the Hel Peninsula, the Geophysical Observatory in Swider and Warsaw University], p. 49-76
- Olczak, T.: **XI Zebranie ogólne Międzynarodowej Unii Geodezyjno-Geofizycznej w Toronto 1957**, [XIth General Assembly of the International Union of Geodesy and Geophysics Toronto, 1957], p. 77-83
- Pokrzywnicki, Jerzy: **The Krządka Meteorite**, p. 84-85
- Kalinowska, Z.: **Burze magnetyczne, zanotowane w roku 1957 w Obserwatorium Geofizycznym w Świdrze**, [Magnetic storms registered in 1957 at the Swider Geophysical Observatory], p. 86-88
- Kalinowska, Z.: **Swider three-hour range indices K and magnetic character-figures C for July to September 1957**, p. 89
- Czyszek, W.: **Hel three-hour range indices K and magnetic character-figures C for July to September 1957**, p. 90

American Geophysical Union, Transactions, Vol. 39, No. 3, June 1958

- Chepil, W. S.: **The use of evenly spaced hemispheres to evaluate aerodynamic forces on a solid surface**, p. 397-404
- Schooley, Allen H.: **Probability distributions of water-wave slopes under conditions of short fetch**, p. 405-408
- Schule, John J., Jr., and Wittmann, Walter I.: **Comparative ice conditions in North America Arctic, 1953 to 1955, inclusive**, p. 409-419
- Straub, Conrad P.; Ludzack, F. J.; Hagee, G. R. and Goldin, A. S.: **Time of flow studies Ottawa River, Lima, Ohio**, p. 420-426
- Simpson, E. S.; Beitem, W. A. and Ruggles, F. H.: **Radiotracer experiments in the Mohawk River, New York, to study sewage path and dilution**, p. 427-433
- Parker, Frank L.: **Radioactive tracers in hydrologic studies**, p. 434-439
- Bryant, G. T. and Geyer, J. C.: **The travel time of radioactive wastes in natural waters**, p. 440-445
- Jordan, J. V.; Lewis, G. C. and Fosberg, M. A.: **Tracing moisture movement in slick-spot soils with radiosulfur**, Pt. 1, p. 446-450
- Setter, Lloyd R. and Straub, Conrad P.: **The distribution of radioactivity from rain**, p. 451-455
- Barker, F. B. and Scott, R. C.: **Uranium and radium in the ground water of the Llano Estacado, Texas and New Mexico**, p. 459-466
- Hess, H. H. and Thurston, W. R.: **Disposal of radioactive waste on land**, p. 467-468
- Brakensiek, D. L.: **Fitting a generalized log-normal distribution to hydrologic data**, p. 469-471
- Sutton, George H. and Berg, Eduard: **Seismological studies of the Western Rift Valley, Africa**, p. 474-481
- Oliver, Jack and Ewing, Maurice: **Short-period oceanic surface waves of the Rayleigh and free shear modes**, p. 482-485

- Gutenberg, B.: *Velocity of seismic waves in the earth's mantle*, p. 486-489
- Zmuda, A.: [Comments on] his: *Extrapolation of scalar magnetic intensity along a radius from the center of the earth*, p. 490
- Cochrane, N. J.; McGuinness, J. L.; Brakensiek, D. L. and Benson, Manual A.: [Discussion of] **W. D. Potter**: *The effect of non-representative sampling of linear regressions as applied to runoff* [and] *Reply by Potter*, p. 497-500
- IGY Bulletin**, No. 11 May 1958, p. 576-590 [For titles in this section, see below under **IGY Bulletin**]
- IGY Bulletin**, No. 12 June 1958, p. 591-608 [For titles in this section, see below under **IGY Bulletin**]
- Annales de Géophysique**, Paris, Vol. 14, No. 1, 1958
- Goguel, Jean: *L'influence des failles et des autres irrégularités de l'écorce sur la compensation isostatique dans l'hypothèse de la régionalité*, [Influence of faults and other irregularities of the crust upon isostatic compensation in the regional hypothesis], p. 1-30
- Choudhury, Mansur Ahmed: *Étude des ondes sismiques dans quelques tremblements de terre profonds de l'Hindou-Kouch*, [Study of seismic waves in some deep earthquakes of the Hindu Kush], p. 31-75
- Kaiser, T. R.: *Relationships between auroral ionization and magnetic disturbance*, p. 76-79
- Meadows, E. B. and Townsend, J. W., Jr.: *Diffusive separation in the winter night time Arctic upper atmosphere 112 to 150 KM*, p. 80-93
- Johnson, Francis S.: *Temperatures in the high atmosphere*, p. 94-108
- Chubb, T. A.; Byram, E. T., Friedman, H. and Kupperian, J. E., Jr.: *The use of radiation absorption and luminescence in upper air density measurements*, p. 109-116
- Townsend, J. W., Jr. and Meadows, E. B.: *Density of the winter night time Arctic upper atmosphere 110 to 170 KM*, p. 117-130
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- Lecce, B. and Del Trono, F.: *Variazioni periodiche del campo barico medio a 500 mb su scala emisferica, e loro utilizzazione nella previsione a lunga scadenza*, [Periodic variations of the mean 500 mb baric field on an hemispheric scale and their use in long range forecasting], p. 1-6
- Sesta Assemblea Generale Dei Soci Società Italiana di Geofisica e Meteorologia**, [Sixth General Assembly of the Italian Society of Geophysics and Meteorology], p. 7
- Lippi-Boncampi, C.: *Schema di classifica genetica di alcuni tipi pedologici rilevati sul promontorio del Gargano*, [Genetic classification scheme of some pedologic types established at the Gargano Promontory], p. 8-10
- Giovagnotti, Celso: *Alcune osservazioni sui metodi d'indagine granulometrica*, [Some observations on the methods of granulometric research], p. 10-12
- Bossolasco, Mario: *Vedute sull'influenzamento artificiale dei fenomeni meteorologici*, [Problems concerning artificial influences on meteorological phenomena], p. 13-17
- Piccardi, Giorgio: *Una precisazione sull'ipotesi solare*, [Verification of the solar hypothesis], p. 18
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PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

- *Acta Geophysica Polonica, [Warsaw].
- Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. and Ser. Geofiz., [Moscow].
- American Geophysical Union, Transactions, [Washington].
- *American Meteorological Society, Bulletin, [Boston].
- *Angewandte Meteorologie, [Potsdam].
- Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
- *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B, [Vienna].
- Australian Journal of Physics, [Melbourne].
- *Australian Meteorological Magazine, [Melbourne].
- *Ciel et Terre, Société Belge d'Astronomie, Météorologie et Physique du Globe, [Brussels].
- *Geofisica e Meteorologia, Società Italiana di Geofisica, [Genoa].
- Geofisica Pura e Applicata, Istituto Geofisico Italiano, [Milan].
- *Geophysical Magazine, Japan Meteorological Agency, [Tokyo].
- Hemel en Dampkring, [The Hague].
- *Időjárás, Magyar Meteorológiai Társaság and Országos Meteorológiai Intézet, [Budapest].
- *Indian Journal of Meteorology and Geophysics, [Delhi].
- *Journal of Atmospheric and Terrestrial Physics, [London].
- Journal of Geophysical Research, [Washington].
- *Journal of Meteorological Research, [Tokyo].
- *Journal of Meteorology, American Meteorological Society, [Boston].
- *Journal Scientifique de la Météorologie, Société Météorologique de France, [Paris].
- *The Marine Observer, Air Ministry, Meteorological Office, London.
- *The Meteorological Magazine, Air Ministry, Meteorological Office, London.
- *Meteorologické Zprávy [Prague].
- *Meteorological Society of Japan, Journal, [Tokyo].
- *La Météorologie, Société Météorologique de France, [Paris].
- *Meteorologija i Hidrologija, [Leningrad].
- *Meteorologische Rundschau, [Berlin].
- *Monthly Weather Review, U. S. Weather Bureau, Washington, D. C.
- Polarforschung, Archiv für Polarforschung, [Kiel].
- *Przegląd Meteorologiczny i Hydrologiczny, [Warsaw].
- Revista de Geofísica, Instituto Nacional de Geofísica, [Madrid].
- *Revista Meteorologica, Junta Nacional de Meteorología, Montevideo.
- *Rivista di Meteorologia Aeronautica, Servizio Meteorologico, [Rome].
- *Royal Meteorological Society, Quarterly Journal, [London].
- *South Africa, Weather Bureau, Notos, [Pretoria].
- *Tellus, Svenska Geofysiska Föreningen, Stockholm.
- Vsesoiuznoe Geograficheskoe Obschestvo, SSSR, Izvestiia, [Leningrad].
- *Weather, Royal Meteorological Society, [London].
- *Weatherwise, American Meteorological Society, [Boston].
- *Wetter und Leben, Österreichische Gesellschaft für Meteorologie, [Vienna].
- *WMO Bulletin, World Meteorological Organization, [Geneva].
- *Zeitschrift für Meteorologie, Meteorologisches Observatorium, Potsdam.

* Indicates those periodicals which are primarily meteorological.

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